Modernizing the Communications Act
Modern is Dynamic not Static

What's Modern in Legislative Context? Modern means dynamic, i.e. current, relevant, and applicable, not static, i.e. based on a fixed assessment of a technology/marketplace at one point in time.

- Legislation can remain modern and stand the test of time only when based on *dynamic* principles/values like market competition, public safety, consumer protection, privacy, and universal service that are consumer-centered, and technologically and competitively neutral.
- Legislation cannot remain modern, if based on regulating *particular technologies* or *artificially-defined markets* because the dynamism of innovation, competition and growth transforms them.
- "Modernizing" *technology-based* law would only repeat past mistakes of inherent obsolescence by re-imposing new static technological and market assumptions that predictably will re-obsolesce and thwart innovation, competition and growth – yet again in the future.
- Legislators need to "*not miss the forest*" of convergence innovation and competitive ecosystems, "*for the trees*" of specific technologies or artificial temporary markets.
- Simply, communications law modernization must replace static assumptions and thinking with dynamic principles, thinking and processes.

Modern Problem: U.S. communications law is static in a dynamic communications world.

- Communications law based on static technology and market snapshots naturally cannot remain current, relevant, or applicable over time.
- Most all problems with communications law can be traced back to static technology and market assumptions that inherently ignore the dynamism of innovation, competition, and growth.
- Change is the only constant, so static technology and market assumptions inherently and increasingly obsolesce and distort over time.
- Static laws that make technology/market snapshot estimates permanent favor: rent-seekers and arbitrageurs; and government picking winners and losers, rather than consumers/competition.

Modern Solution: Dynamic law that fosters the dynamism of innovation, competition, and growth.

- A clean-slate rewrite based on consumer-centric principles that are technologically and competitively neutral and based on market economics and competition.
- A clean slate repeal that variably sunsets all static-technology-specific communications laws and replaces them with dynamic, universal and timeless, consumer-centric principles and social values: market competition, public safety, consumer protection, privacy & universal service.
- A universal economy-wide communications law is applied in a consumer-centric, technology-neutral way so that consumers can know what basic communications protections they enjoy regardless of technology, circumstance, or time period.
- Law that requires modern management of our Federal spectrum resources and process; a clean-slate replacement of the current static, unaccountable, and dysfunctional spectrum process with a modern, dynamic, and accountable management of this critical communications resource.

Scott Cleland, Chairman of NetCompetition, a pro-competition e-forum supported by broadband interests. 1-31-14

A Modern Vision for the FCC

How the FCC Can Modernize its Policy Approaches For the 21st Century

Scott Cleland

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November 4, 2013

[redacted]

** NetCompetition® is a pro-competition e-forum supported by broadband interests. www.NetCompetition.org*
*** Precursor® LLC is a research consultancy serving Fortune 500 clients. www.Precursor.com*

Outline

I. Defining Modern & Nostalgist FCC Visions

II. Problems

A. America's Biggest 21st Century Communications Problems

B. The FCC's Biggest 21st Century Problems

C. The FCC's Worst Nostalgist Tendencies

D. The FCC's Obsolete Public Interest Test

III. Solutions

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– Bio
– NetCompetition White Paper 11-15-12: *Modern Beats Obsolete In Spurring Economic Growth & Innovation: Modernize Obsolete Communications Law & Spectrum Management*

Defining Modern & Nostalgist FCC Visions

A Modern FCC Vision
New, contemporary, up-to-date

1. Forward-looking, progress-driven
2. Predicated on current facts and realities
3. Increasingly efficient/practical/productive
4. Current with societal expectations/needs
5. Worthy of continuing and building upon
6. Responsive, flexible, adaptable to change
7. Computer, digital, software-driven
8. Mobile/wireless, independent-of-location
9. Converged, integrated-services/functionality
10. Internet, distribution-technology-agnostic
11. Consumers pick winners and technologies
12. Consumer/market/economics-driven
13. Market economic: attracting investment
14. Competitive information services
15. Competition policy, light-touch regulation
16. Voluntary, competitive peering arrangements

A Nostalgist FCC Vision
Old, outdated, obsolete

1. Backward-looking, status-quo-driven
2. Predicated on past facts and realities
3. Decreasingly efficient/practical/productive
4. Falling behind societal expectations/needs
5. Unworthy of continuing or building upon
6. Rigid, slow, limited ability to adapt to change
7. Electrical, analog, hardware-driven
8. Stationary/wired, location-dependent
9. Silo-ed, single-service/functionality
10. Technology-specific distribution focus
11. Regulators pick winners and technologies
12. Government regulation/subsidy-driven
13. Govt. uneconomics: disinvestment and decay
14. Monopoly telecom or cable services
15. Insinuates cable monopoly/wireless duopoly
16. Compulsory, regulated interconnection

America's Biggest 21st Century Communications Problems

1. Obsolete U.S. communications law and policy:
   - Incorrectly assumes telephone/cable monopolies and no competition or Internet;
   - Limits user benefits, savings & productivity; discourages *new* innovations for users; slows technological, Internet and commercial progress; burdens investment and economic growth; renders infrastructure and property less valuable and attractive; and undermines American competitiveness.
2. The interests of the obsolescing FCC are diverging from public's interests:
   - The public's interests in progress, innovation, competitive choice, & modern infrastructure are increasingly at odds with the FCC's self interest in applying obsolete law and self-creating new authority to remain relevant in the 21st century.
3. Government's waste , hoarding & archaic management of radio spectrum:
   - Creates unnecessary artificial spectrum scarcity & business/investment uncertainty;
   - Will starve mobile revolution of smart-phones, tablets and the Internet of things of the most essential natural resource, spectrum, that they need to compete, grow, innovate & operate wireless broadband networks that can meet exploding demand.
4. FCC barriers to the IP transition and more broadband competition:
   - Rather than facilitating the IP transition, the FCC is impeding it by slow-rolling pilot tests that could quickly identify and address potential transition problems.

The FCC's Biggest 21st Century Problems

1. 1G government in 4G world; FCC's at risk of being more of a problem than a solution.
   - The speed of the marketplace continues to lap the FCC's speed of government. The FCC continues to cling to the past and is falling further behind as others regularly modernize.
   - Inexplicably, the FCC has ~same number of staff that it did before competition & deregulation in 1996.
2. FCC is ignoring that technology & competition can disrupt & obsolete govt. agencies too.
   - The FCC imagines they are independent from Congress and that they don't have to ask Congress to update their core authority, mission, and public interest definition; or to reorganize or modernize to stay current.
3. FCC is in denial that its core authority is obsolescing from tech and competitive change.
   - FCC imagines monopoly approaches based on 1887 railroad regulation, & 1912/1934 tech & economic assumptions, are still applicable to 21st century technology & market competition.
   - Congress has already sunset-ted all other common carrier regulators: ICC in 1980, and CAB in 1984.
4. FCC imagines it doesn't need Congress/new legislation to remain legal and relevant.
   - Courts blocked the FCC's sweeping UNE-P rewrite of 96 Telecom Act; blocked the FCC's presumption of net neutrality enforcement authority in *Comcast v. FCC*; & may block FCC application of common carrier obligations on info services in *Verizon v. FCC*. The FCC is near strike-three in trying to bypass Congress.
5. FCC often views modernization as antithetical to the FCC's self-interest.
   - The FCC's 1934 authority created a powerful FCC-centric regulator of monopoly telephone service and regulated radio broadcast service of government-owned spectrum.
   - Thus the FCC often views facilitation of the IP transition towards unregulated information services and recognition that competition policy has succeeded as bad developments for the FCC.

Simply, the FCC's interests appear to be diverging from America's real public interests.

The FCC’s Worst Nostalgist Tendencies

1. Viewing successful competition as a threat to the FCC’s traditional monopoly-era powers.
2. Coercing industry compliance by threatening stock-crushing reclassification of broadband as a Title II monopoly, common-carrier telephone service.
3. Sabotaging competition policy by:
   - Ignoring telephone and cable are no longer monopolies, but competitive markets.
   - Denying that wireless-wired competitive substitution is real and obvious, in order to ignore that wireless, video, and special access are competitive services.
   - Not pushing the Executive Branch to stop hoarding and wasting spectrum that consumers, competitors and the economy need to meet exploding broadband data demand and grow; and that competition needs to remain vibrant.
4. Imagining that technological changes of video, computers, Internet, broadband, smart-phones, and a law/policy change from monopoly regulation to competition de-regulation, has no effect on the applicability of FCC’s original 1934 general and public interest authorities.
5. Viewing the FCC’s 19th century-based, amorphous Public Interest Test PIT as carte blanche power to do whatever three FCC commissioners want to do to the companies involved while maintaining the public fiction that PIT merger conditions are “voluntary.”
6. Maintaining that the FCC’s legacy monopoly-era Section 214 authority to require prior approval of changes in infrastructure should continue to apply even when the underlying service is no longer a monopoly and no longer warrants monopoly regulation and oversight.

The FCC’s Obsolete Public Interest Test

The FCC’s Public Interest Test (PIT) is:

- *Obsolete*: The PIT was originally an 1880s railroad regulation concept that Govt. applied to radio broadcast licenses in the 1920s, and then automatically to all wireless licenses since.
  - The 1880’s PIT incorrectly assumes innovation cannot create competitive alternatives (when cars, trucks & planes became railroad alternatives; & TVs, computers & Internet became radio alternatives.)
  - The 1880’s PIT incorrectly assumes new technologies are monopolies requiring regulation, and that facilities-based competition isn’t possible (when cell phones, cable, & VoIP became competitors to voice, and when cable, fiber, wireless, and satellite became competitors to dial-up Internet service.)
  - The 1880’s PIT assumes spectrum is government property, but Congress changed the law so wireless licenses are private property that private owners can buy and sell.
- *Arbitrary & unpredictable*: After 80 years ,there are still no objective PIT guidelines or binding precedents, so the PIT routinely degenerates into an unpredictable ad-hoc, political-free-for-all that begs capricious manipulation by special interests and competitors seeking advantages.
- *Discriminatory*: PIT review is unfair: it only applies to transactions, not to similar situations. It only applies to licensed spectrum, not those who do the same thing via unlicensed spectrum.
- *Extortionate*: Special interest groups and competitors routinely ambush companies because they know the PIT turns companies into proverbial “sitting ducks.” It provides leverage to extort regulatory concessions that could never be achieved under due process/rule of law.

A Solution: A Modern FCC Competition Policy

- Find that market competition policy is not the rival or enemy of the FCC, but is the law and congressional policy; and it works and has greatly benefited consumers.
- Remember the 1996 Telecom Act's new purpose for the FCC was "*to promote competition and reduce regulation*," not reduce-competition-to-promote-regulation as many want the FCC to do now.
- Learn from the FCC's worst "competition" mistakes of the past, that imposed **uneconomic** price/term conditions on the market, lace, which , redictabl, proved to be economically unsustainable and unworkable.
  – Remember FCC 1994 cable rate regulation crushed investment, and FCC 1996 CLEC/reciprocal compensation policies bankrupted the CLEC & fiber backbone industries, which delayed cable and telco broadband modernization for years.
- **Understand competition works when its market-based, because markets require <u>sustainable economics</u>.**
- **Define competition with <u>market-based</u>, not FCC-based, costs, prices, terms and conditions.**
  – Measure its success/failure with market-based measures: customer-switching, pricing rivalry and trajectory, increasing consumer value, levels of investment, and amount of competitive differentiation, innovation, etc., not just market share.
- Appreciate FCC can promulgate anti-competition regulations, just like companies can act anti-competitively.
- **Make it FCC official competition policy that if the Government has any coercive power over private broadband network providers, it would be improper, unfair, and anti-competitive for the Government to build or operate public broadband networks to compete with private broadband network providers.**
- **Conclude:**
  – **Wireless and wired services are technological and competitive substitutes.**
  – **Telephone & cable are no longer monopolies, but competitive markets.**
  – **Copper-based business broadband access is no longer a monopoly service, so legacy special access subsidies & regulations promote-regulation-and-reduce-competition & are anti-competitive & discourage innovation.**
  – **Internet convergence increasingly creates highly-disruptive new vertical competition.**
  – Regulations that impose uneconomic mandates – i.e. subsidies or picking market winners and losers -- are anti-competition and anti-competitive.
  – Internet peering is incompatible with legacy interconnection.
- If the FCC finds anti-competitive behavior in competitive communications markets, refer them to the DOJ Antitrust Division for investigation.

A Solution: A Modern Public Interest Test

- Define the public interest as a current, contemporary, and up-to-date, public interest, based on today's facts/realities, not out-of-date, obsolete assumptions.
  - How can it be in the 21st century public interest to ignore: the Internet; vibrant market competition; that all distribution technologies are not monopolies; and that there is no longer government ownership, but private ownership of spectrum?
- Create formal guidelines that describe what the public interest is based on: i.e. fair, generally-applicable principles; much like the DOJ has done in antitrust law with its Horizontal Merger Guidelines.
- In merger review, determine what unique competition expertise the FCC adds, if any, to the merger review, to ensure that it is not redundant of the DOJ's review, and then focus solely on that unique FCC incremental area of expertise.
- *Important Note:* Communications companies are the only companies in America to be subject to unnecessary duplicative, or repetitive merger reviews by the DOJ, FCC and State PUCs/local franchise authorities.
  - That special case is no longer legitimate because that redundant merger reivew is predicated on obsolete law that inaccurately assumes monopolies and not competitive markets, and government-owned spectrum and not private-property spectrum.

Recommendation: A Modern FCC Policy Agenda

1. Pursue modern policies that are best for America not that are best for the FCC.
2. Determine what FCC authorities/policies are now obsolete by innovation and/or market competition, and forbear. Ask Congress to sunset obsolete laws and modernize what remains.
3. Determine what principle-based authority the FCC needs to protect consumers and the public safety in the 21st century and formally ask Congress for that authority.
4. Ask Congress to require fiscal accountability for government-used spectrum, to ensure sufficient spectrum below 3GHz is available for auction to meet market demand, and to ensure sufficient spectrum above 3GHz is available for unlicensed use to meet demand.
5. Facilitate, do not impede, market-driven transitions like the IP transition and the spectrum transition from predominantly government use to predominantly public use.
6. Modernize FCC competition policy to be based on market economics and facts, not subsidies and special rules designed to pick winners and losers; recognize wireless and video are competitive and substitutes; and recognize telephone and cable are no longer monopolies.
7. Modernize the public interest test from 1880's implicit market assumptions to be applicable to the 21st century Internet and competitive market realities.
8. Declare it improper & unfair for Government (with coercive regulatory, law enforcement, and tax power) to build/operate government networks that compete with private networks.
9. Future-proof. Only regulate real provable harms based on principles, not technologies that naturally obsolesce, markets that disappear, or companies that can go bankrupt.

Appendix: NetCompetition, Precursor LLC, & Scott Cleland

- **NetCompetition®** is a pro-competition e-forum supported by broadband interests that promotes competitive Internet choices for consumers. See: www.NetCompetition.org

- **Precursor® LLC** is a proven thought leader and industry research consultancy for Fortune 500 companies specializing in the future of: Internet competition, property rights, privacy, cyber-security and cyber-ideology; algorithmic markets; and communications competition and de-regulation. See: www.Precursor.com

- **Scott Cleland** is a precursor: a proven thought leader with a long track record of industry firsts. Cleland is President of Precursor LLC and Chairman of NetCompetition. He authors the widely-read PrecursorBlog.com. Cleland served as Deputy United States Coordinator for Communications and Information Policy in the George H. W. Bush Administration. Eight Congressional subcommittees have sought Cleland's expert testimony. *Institutional Investor* twice ranked him the #1 independent analyst in his field. Scott Cleland has been profiled in *Fortune, National Journal, Barrons, WSJ's Smart Money, and Investors Business Daily*. Ten publications have featured his op-eds. See: www.ScottCleland.com

Modern Beats Obsolete
In Spurring Economic Growth & Innovation
Modernize Obsolete Communications Law & Spectrum Management

Scott Cleland

Chairman, NetCompetition®* & President, Precursor® LLC**

November 15, 2012

[redacted]

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Outline

Obsolete Law & Regulation

- What Makes it Obsolete?
- FCC Regulation Is an Historical Anomaly
- How Did This Anomaly Happen?
- Law Ignores Five Technology Changes
- Five Ways Law Has Held America Back
- From Monopoly to Competitive Economics
- What's The Harm From Obsolete Law?

Obsolete Spectrum Management

- Spectrum Management Is an Historical Anomaly
- Spectrum Is a Resource Management Outlier
- Spectrum is the Worst Managed Resource
- Obvious Waste of Government Spectrum
- How Did This Anomaly Happen?
- Why Is U.S. Spectrum Management Dysfunctional?

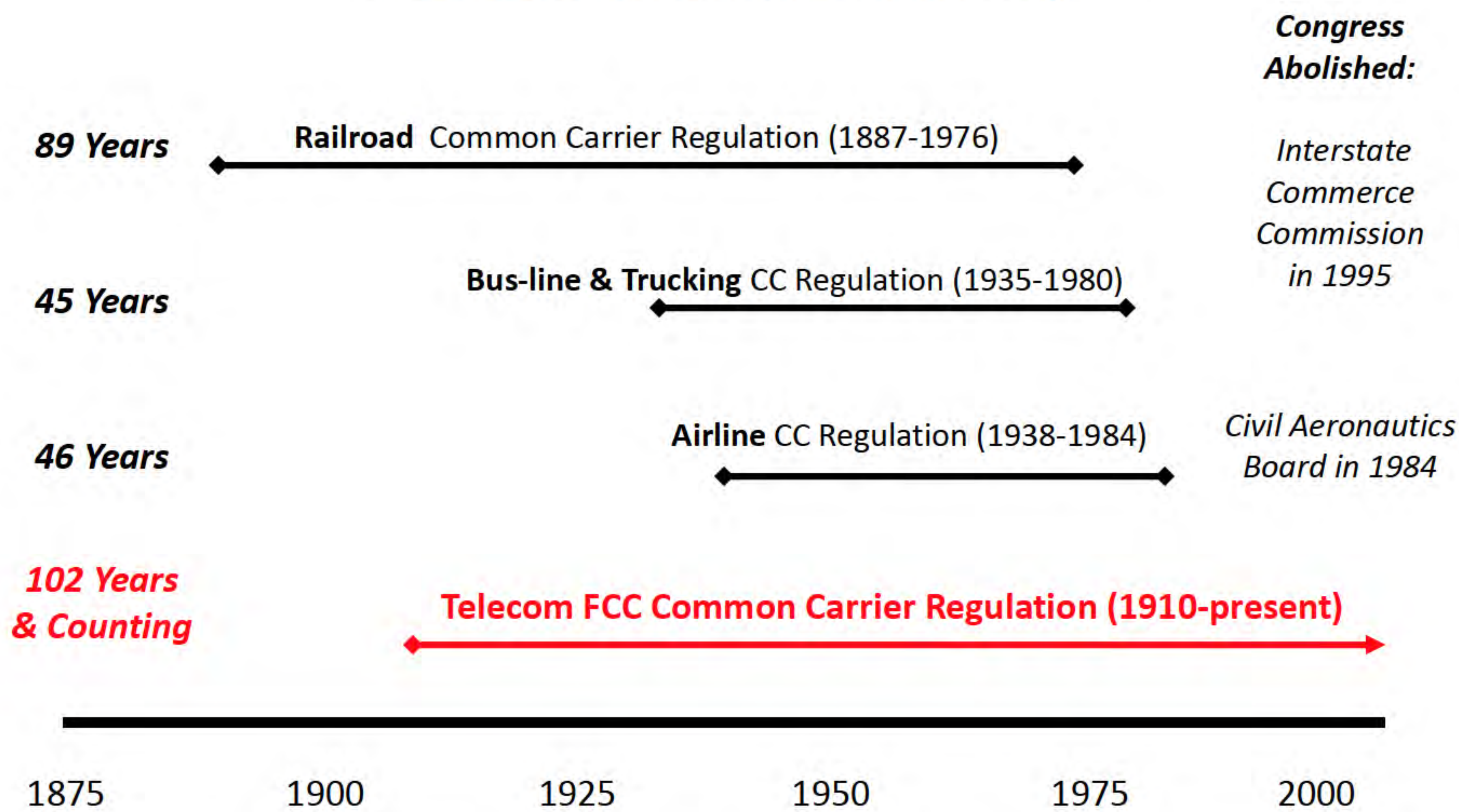
Conclusions

Recommendations

What Makes Law Obsolete?

- **1881 analog telephone, and 1912 radio, technological presumptions**,
  - Despite their obsolescence with the advent of the TV, transistors, satellites, microchips, computers, fiber optics, cellular, Internet, smart-phones, etc.
- **1887 railroad common carrier regulation presumption**,
  - Despite the ending of such regulation for railroads 36 years ago;
- **1934 telephone subsidy system presumption**,
  - Despite achieving the goal of universal service ~20 years ago;
- **1940's antiquated management of national resources,**
  - Despite 20 years of obvious, ever-increasing commercial demand for more spectrum auctions of the Federal government's spectrum hoard;
- **1984 AT&T break-up presumption,**
  - That local and long distance voice services were separate, despite voice being an "app" and long distance being a free integrated feature in the broadband IP all-distance world for several years;
- **1992 cable monopoly presumption,**
  - Made obsolete by the 40% share loss to DBS & Telco video-competition; &
- **1996 un-bundling-competition law**
  - Made obsolete by the mass CLEC bankruptcies, a trillion dollar fiber bubble, and the loss of two-thirds of monopoly voice PSTN customers to cable, wireless and Internet competition.

FCC Common Carrier Regulation Is an Historical Anomaly



Sources: FCC, U.S. Govt.

How Did This Anomaly Happen?

- Politically, telecom was treated differently than other common "carrier" technologies: railroads, trucks, buses and airlines.
  - In the 1913 "Kingsbury Commitment" the U.S. government politically decided to approve of a *national* monopoly with rate-of-return, common-carrier regulation, in return for a business commitment to deliver subsidized universal phone service at reasonable rates.
  - The 1934 Communications Act then codified this 1913 political agreement to legally sanction a national monopoly in return for subsidized ubiquitous telephone service.
- In contrast the Government did not grant railroads, trucking, bus-lines or airlines *national* monopolies in return for serving every American.
  - The Government also recognized new technologies made common carrier regulation obsolete;
  - Thus they de-regulated: railroads in 1976, trucking and bus-lines in 1980, and airlines in 1984; and abolished the Civil Aeronautics Board in 1984 and the Interstate Commerce Commission in 1995.
- When other common carrier industries were de-regulated in the 1970s because of competition, the Government-sanctioned monopoly was embroiled in an antitrust suit;
  - The Government's unique political grant of a national monopoly for telephone eventually created barriers for technology-enabled competition and fostered AT&T's inherent anti-competitive behavior.
  - New microwave communications technology, created long distance competition to AT&T, but to enable it, the DOJ had to sue and breakup AT&T into a long distance company, an equipment company, and seven local phone "Bells."
- When Congress passed the 1996 Telecom Act, the government's political grant of a national telephone monopoly ended and telecom competition was the new law of the land.
- Resultant facilities-based voice competition from cable, wireless, and Internet has led to a two-thirds loss in market share and created the predicate for ending common carrier regulation of voice like the Government ended common carrier regulation for railroads, trucking, buses and airlines.

The Law Ignores Five Technology Changes

1. The sea change from inefficient **analog** to ever-increasingly-efficient **digital** computer/Internet technologies;
2. The virtuous **Moore's Law** ~50 year trend of microchip performance doubling every ~18 months;
3. The virtuous **Cooper's Law** ~104 year trend of radio transmission efficiency doubling every ~30 months;
4. The virtuous steady efficiency gains in **digital compression innovation** that enable the same wire line or wireless spectrum to transmit increasingly more throughput or effective bandwidth over time; and
5. **Internet convergence** from *single*-service technology silos (telecom, broadcast, cable, satellite, & wireless) to *converged* voice/data/video services Internet technology platforms and facilities.

Five Ways the Law Has Held America Back

1. **Telephone service** changed little in 50 years;
   – (1934-1984);
2. **Cell phone** took 33 years to get to market;
   – (1949-1982);
3. **Internet packet-switching** took 25 years to commercialize;
   – (1969-1994);
4. **PC modem** took 25 years to be broadly commercialized;
   – (1977- 2002); &
5. **Broadband service** took 17 years to be broadly commercialized;
   – (1988-2005).

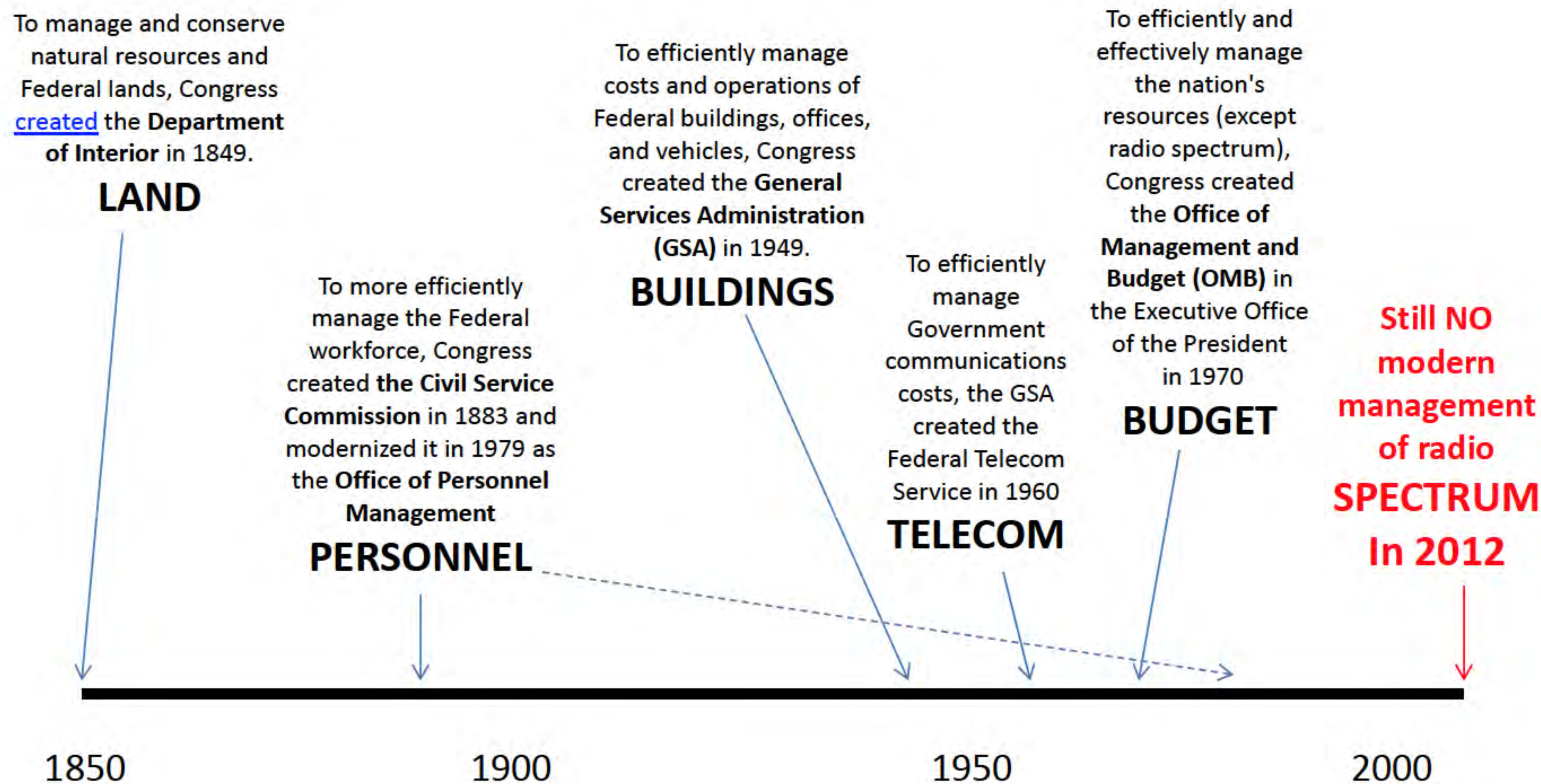
From Monopoly to Competitive Economics

- *Legacy* law assumes an <u>analog</u> electrical *continuous* voltage function technology.
  - For telecom that means dedicated continuous end-to-end telephone circuits between locations;
  - While very durable, the analog PSTN is highly-inefficient relative to digital networks.
- *Legacy* law does not explicitly recognize today's <u>digital</u> technology, which is the opposite of analog in being the discrete/*discontinuous* voltage technology function of computers;
  - A discrete, discontinuous technology is an infinitely interchangeable building-block technology;
  - Digital allows near infinite functional integration of data/voice/video and every info type;
  - Digital is orders of magnitude more efficient and functional than analog technology:
    - Digital harnesses Moore's Law doubling of chip performance every ~18 months, which creates a virtuous ever-increasing capability to get more efficiency/capacity out of the same wire/cable or radio spectrum over time.
- At bottom, with every Moore's Law cycle, digital tech has gotten at least twice as efficient as analog technology. To put this in perspective digital technology has gotten *at least*:
  - ~1,000 times more efficient since the 1996 Telecom Act;
  - ~8,000 times more efficient since the 1992 Cable Act, and
  - ~256,000 times more efficient since the 1984 breakup of AT&T and the 1984 Cable Act.
- Simply, the transition from analog continuous to digital discontinuous technology is a transition from analog monopoly economics to digital competitive economics because:
  - A national ~$200b analog continuous PSTN network worked most efficiently as a monopoly network because it was extremely complicated for <u>regulators</u> to unbundle competitively;
  - Whereas digital discontinuous Internet protocol technology enables <u>engineers</u> to easily and quickly configure devices, transmission technologies, and networks, increasingly efficiently over time.
  - **Digital technology enables robust facilities-based communications competition.**

What’s the Harm from Obsolete Law?

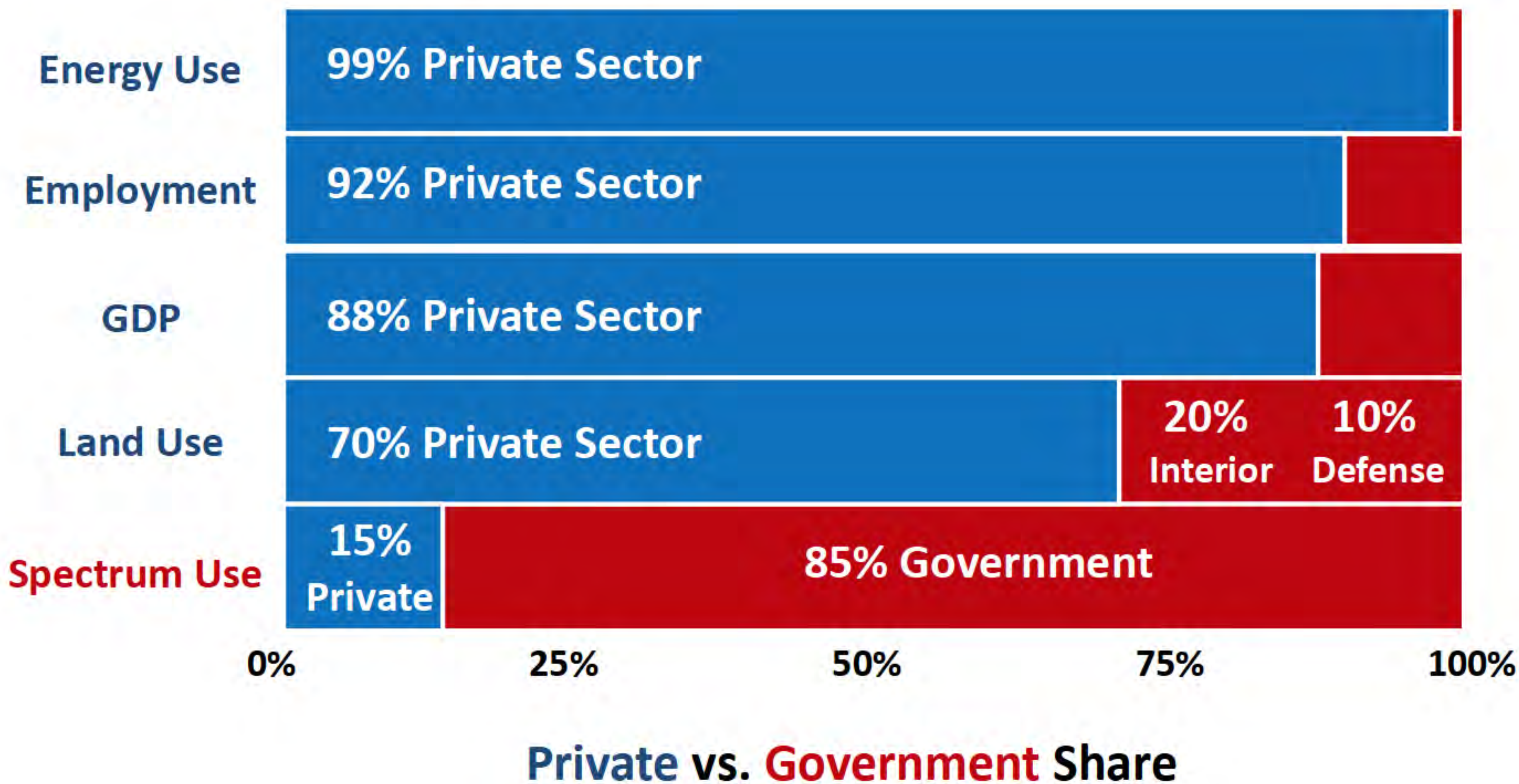
1. Limits **user** benefits, savings & productivity
   – By discouraging adoption and commercialization of *existing* innovations;
2. Discourages *new* innovations for **users**
   – That could solve niche user wants, needs, and means with one-size-fits-all limits;
3. Slows technological, Internet and commercial progress
   – By forcing bandwidth performance to lag computing and storage performance;
4. Burdens investment and economic growth
   – By assuming analog monopolies and not digital competitive communications;
5. Renders infrastructure and property less valuable and attractive
   – As its usefulness can’t stay current and competitive; and
6. Disadvantages American competitiveness
   – When foreign competitors aren’t burdened with the same drag of obsolete law.

Spectrum Management Is an Historical Anomaly



Sources: NTIA, U.S. Govt.

Spectrum Is a Resource Management Outlier



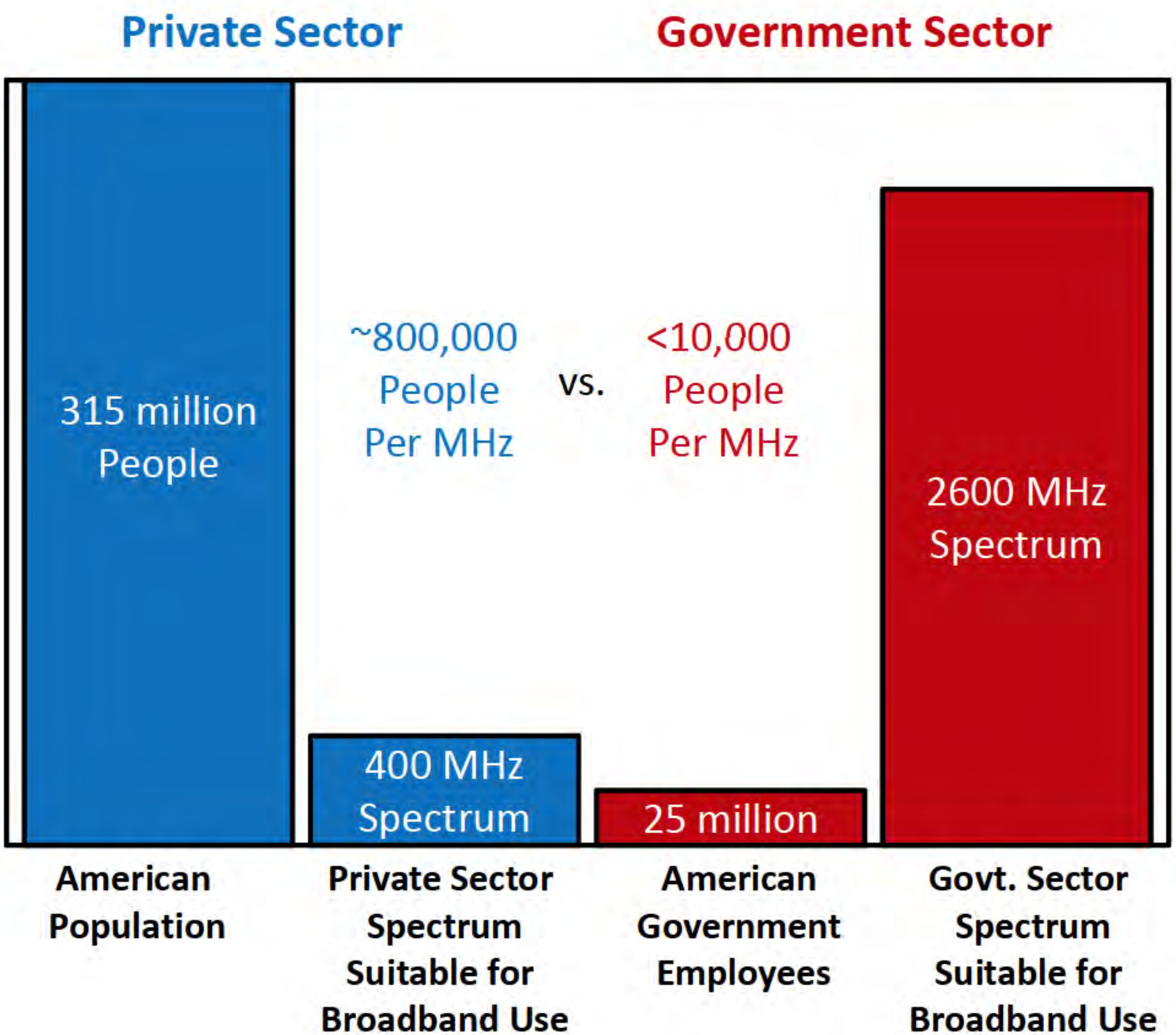
Sources: *DOE, CEA, Interior, & NTIA*

Spectrum Is the Worst-Managed Resource

- Shockingly in 2012, there remains no accountable Federal manager of radio spectrum,
  - Despite spectrum being the 21st century's most valuable natural resource and the essential fuel of the private sector mobile technology revolution of smart phones, tablets and the Internet of things.
- Equally shocking is that the Federal Government's spectrum inventory management system hasn't changed materially since 1992, despite:
  - American wireless subscribers growing 3,000% from 11 million connections to 331 million;
  - Congress revolutionizing the economics of spectrum by mandating public auction of spectrum to the highest bidder; and
  - The exponential explosion of demand for wireless driven by: the Internet, smart phones, tablets, and video streaming technology.
- Most shocking of all is that a national resource that can enable a ~trillion dollars plus in economic activity is so wasted and backwardly-managed as if it is not important to America’s future.

Obvious Waste of Government Spectrum

Private Sector Spectrum Utilization is >80 Times Higher Than Government Sector



Note: Over 100 years, 30 Government agencies incrementally received 3,000 spectrum allocations with minimal accountability or oversight

Sources: *U.S. Census Bureau, CEA, & NTIA*

How Did This Anomaly Happen?

- The basic legal authority for the Federal Government to manage the inventory of radio spectrum and assign who can use what radio frequencies for what use is obsolete. It hasn't substantively changed since 1934, despite the:
  - Advent of the TV, radar, microwave communications, satellites, cell-phones, the Internet, smart phones or tablets; and
  - Fact that these technology changes have created vastly more private sector demand for radio spectrum than there is supply for private sector use.
- The current Federal steward of radio frequency assignment authority is the low-level Office of Spectrum Management buried in the Office of the Assistant Secretary of Commerce for Communications and Information.
  - While ostensibly it has the responsibility for "managing" the Federal spectrum inventory and assignments, it has minimal legal or delegated authority, power, or clout to actually efficiently or effectively manage the Nation's spectrum for the benefit of the Nation or the U.S. taxpaying public.
  - In reality, they are a caretaker/bookkeeper of the nation's spectrum, not a manager of it; no one is.
- Since virtually all broadband-suitable frequencies have already been assigned to a government bureaucracy for free, the current ad hoc committee process of managing spectrum is dysfunctional, because it has those who already use the spectrum effectively deciding whether or not they have to give it up.
  - Not surprisingly, any government entity that was assigned a valuable frequency for free in the past -- long before spectrum became so valuable and scarce -- is loathe to give it up.
  - Moreover, they also appreciate that there is seldom anyone paying attention in the Executive Branch or Congress, which has the power to get it reassigned to a higher or better use.

Why is U.S. Spectrum Management Dysfunctional?

- There is no modern management of this resource or process.
  - No coherent Federal policy that spectrum is a valuable scarce resource that needs to be conserved, well-managed and put to its highest and best use for the Nation and the American taxpayer.
  - No OMB-level review -- independent of the departments and agencies that control the spectrum -- to verify that it is being responsibly managed.
  - No formal annual spectrum budget process in the executive or legislative branch, where Government spectrum holders have to justify their continued use of the spectrum, defend why they can't share their spectrum with other bureaucracies, or why they can't clear it for public auction.
  - No regular audit or official accountability process to ensure that this valuable spectrum is being efficiently-used, fully-utilized and not wasted.
  - No required economic opportunity-cost analysis or cost-benefit analysis of Federal spectrum use.
- As long as there is no requirement for Government bureaucracies to pay annually for the value enjoyed from their spectrum use, like they have to pay for the energy, personnel and other resources that they use, spectrum will be managed in a dysfunctional manner and bureaucracies will not understand or appreciate the alternative value this scarce resource has to the private sector.
  - Simply, if a valuable scarce resource is perpetually free to use by a lucky select few, it will be wasted and hoarded.

Conclusion

- Obsolete law/regulation/spectrum management increasingly is a:
  - **Dead end** with no future; it mandates that communications live in past;
  - **Unnecessary drag** slowing investment & innovation, as it forces innovation 'round pegs' into obsolete 'square holes;'
  - **Nonsensical waste** of precious time and resources, as it generates uncertainty, busy work, and red tape;
  - **Cost sinkhole** as it mandates subsidized obsolete service availability everywhere when demand is collapsing rapidly;
  - **Counter-productive** "government may I?' burden on too much communications-driven economic activity; and
  - **Absurdly dysfunctional** part of an otherwise efficient and free market Internet ecosystem.
- The status quo of U.S. communications policy has become an increasingly absurd "Rube Goldberg machine"
  - Of complex rules, regulations and red tape that make simple technological and business tasks unnecessarily convoluted and inefficient.
- **Bottom Line: U.S. Communications policy is in obvious and urgent need of modernization for the 21st Century Internet and mobile economy.**

Recommendations

Modernize Obsolete Law & Regulation

1. Modernize communications law/regulation to be consumer-centric and technology-neutral.
   - Don't premise future laws or regulations on *static technology-specific assumptions or policy* that will become obsolete with tech change, but on *dynamic technology-neutral assumptions or policy* that are unaffected by technology change.
   - If there is a need for a transitional technology-specific law/regulation it should be temporary and have a hard sunset date.
2. Proactively cull out legacy law and regulations that are a barrier to or impede the IP transition and competition; and ensure they are both sunset-ed and not applied to the Internet ecosystem.

Modernize Obsolete Government Spectrum Management

1. Get much more Government spectrum to private sector auction soonest.
   - The Government should reclaim **an additional 1650 MHz** of spectrum suitable for broadband use for private sector use by 2032 -- to transition from controlling 85% of the Nation's spectrum today to <30% by 2032.
2. By law or executive order establish that:
   - Spectrum is a valuable resource to be utilized efficiently and put to its highest and best use for the Nation;
   - OMB manages government spectrum allocations, finds under-utilized spectrum for auction to lower the deficit;
   - OMB accords a monetary value to spectrum and requires those using it to pay market rates for the value received from their spectrum use, like they pay for other resources they use like energy, personnel, etc.
   - Ensures that all Government spectrum users annually justify their continued use of the spectrum, defend why they can't share it with other government entities, or why they can't clear it for public auction.
   - Guards against spectrum waste via a process that ensures that this valuable spectrum is being efficiently-used, fully-utilized and not wasted via: audits, economic opportunity-cost analysis & cost-benefit analysis.

Appendix: NetCompetition, Precursor LLC, & Scott Cleland

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  - See: www.Precursor.com ;
- **Scott Cleland** is a precursor: a research analyst with a track record of industry firsts. He is Chairman of NetCompetition, President of Precursor® LLC, and author of the widely-read PrecursorBlog. During the George H. W. Bush Administration, he served as Deputy United States Coordinator for Communications and Information Policy at the U.S. Department of State. Eight Congressional subcommittees have sought Cleland's expert testimony and *Institutional Investor* twice ranked him the #1 independent telecom analyst. Scott Cleland has been profiled in *Fortune, National Journal, Barrons, WSJ's Smart Money, and Investors Business Daily.*
  - See: www.ScottCleland.com

Modern Beats Obsolete
In Spurring Economic Growth & Innovation
Modernize Obsolete Communications Law & Spectrum Management

Scott Cleland

Chairman, NetCompetition®* & President, Precursor® LLC**

November 15, 2012

[redacted]

** NetCompetition® is a pro-competition e-forum supported by broadband interests. www.NetCompetition.org*
*** Precursor® LLC is a research consultancy serving Fortune 500 clients. www.Precursor.com*

Outline

Obsolete Law & Regulation

- What Makes it Obsolete?
- FCC Regulation Is an Historical Anomaly
- How Did This Anomaly Happen?
- Law Ignores Five Technology Changes
- Five Ways Law Has Held America Back
- From Monopoly to Competitive Economics
- What's The Harm From Obsolete Law?

Obsolete Spectrum Management

- Spectrum Management Is an Historical Anomaly
- Spectrum Is a Resource Management Outlier
- Spectrum is the Worst Managed Resource
- Obvious Waste of Government Spectrum
- How Did This Anomaly Happen?
- Why Is U.S. Spectrum Management Dysfunctional?

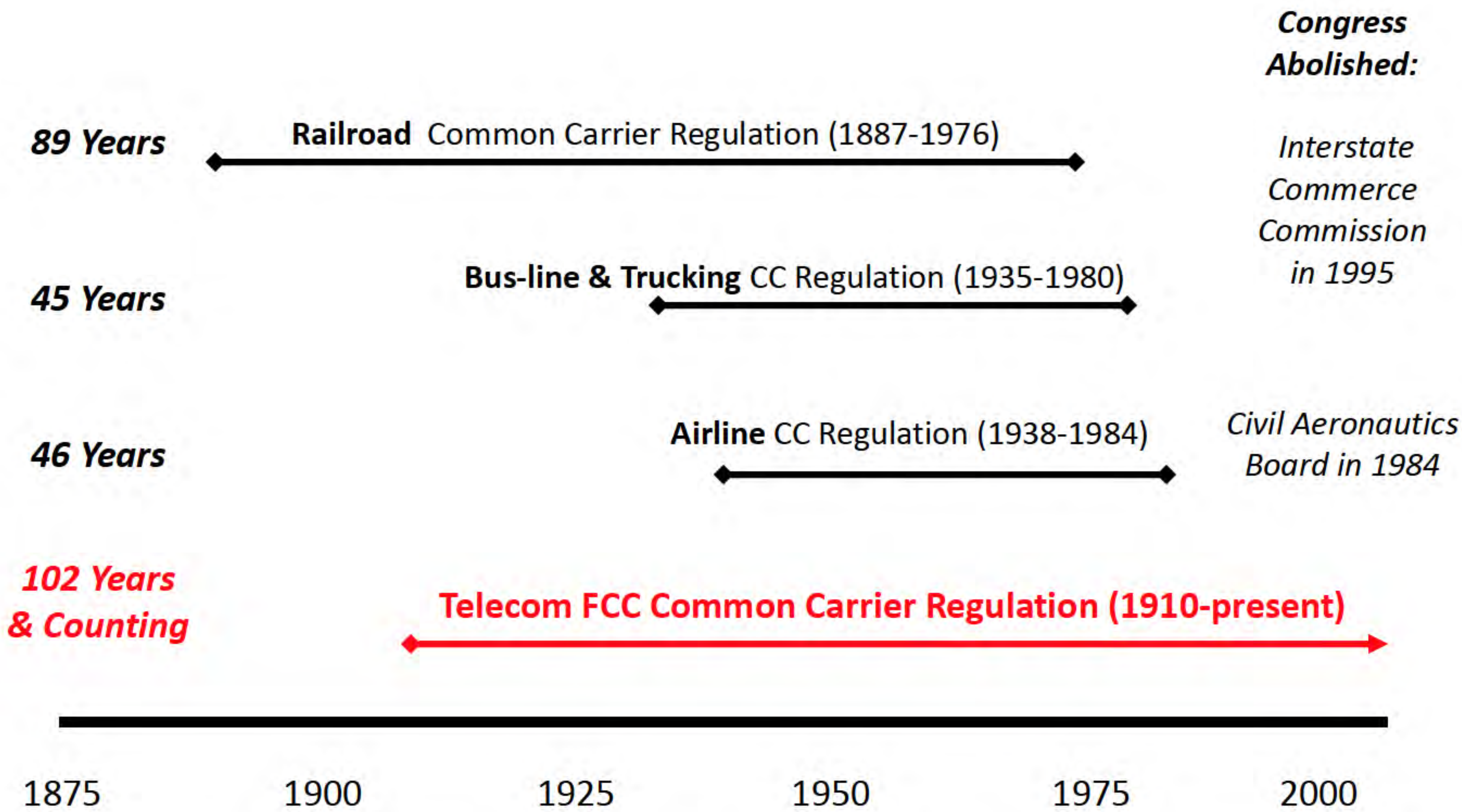
Conclusions

Recommendations

What Makes Law Obsolete?

- **1881 analog telephone, and 1912 radio, technological presumptions,**
  - Despite their obsolescence with the advent of the TV, transistors, satellites, microchips, computers, fiber optics, cellular, Internet, smart-phones, etc.
- **1887 railroad common carrier regulation presumption,**
  - Despite the ending of such regulation for railroads 36 years ago;
- **1934 telephone subsidy system presumption,**
  - Despite achieving the goal of universal service ~20 years ago;
- **1940's antiquated management of national resources,**
  - Despite 20 years of obvious, ever-increasing commercial demand for more spectrum auctions of the Federal government's spectrum hoard;
- **1984 AT&T break-up presumption,**
  - That local and long distance voice services were separate, despite voice being an "app" and long distance being a free integrated feature in the broadband IP all-distance world for several years;
- **1992 cable monopoly presumption,**
  - Made obsolete by the 40% share loss to DBS & Telco video-competition; &
- **1996 un-bundling-competition law**
  - Made obsolete by the mass CLEC bankruptcies, a trillion dollar fiber bubble, and the loss of two-thirds of monopoly voice PSTN customers to cable, wireless and Internet competition.

FCC Common Carrier Regulation Is an Historical Anomaly



Sources: FCC, U.S. Govt.

How Did This Anomaly Happen?

- Politically, telecom was treated differently than other common "carrier" technologies: railroads, trucks, buses and airlines.
  - In the 1913 "Kingsbury Commitment" the U.S. government politically decided to approve of a *national* monopoly with rate-of-return, common-carrier regulation, in return for a business commitment to deliver subsidized universal phone service at reasonable rates.
  - The 1934 Communications Act then codified this 1913 political agreement to legally sanction a national monopoly in return for subsidized ubiquitous telephone service.
- In contrast the Government did not grant railroads, trucking, bus-lines or airlines *national* monopolies in return for serving every American.
  - The Government also recognized new technologies made common carrier regulation obsolete;
  - Thus they de-regulated: railroads in 1976, trucking and bus-lines in 1980, and airlines in 1984; and abolished the Civil Aeronautics Board in 1984 and the Interstate Commerce Commission in 1995.
- When other common carrier industries were de-regulated in the 1970s because of competition, the Government-sanctioned monopoly was embroiled in an antitrust suit;
  - The Government's unique political grant of a national monopoly for telephone eventually created barriers for technology-enabled competition and fostered AT&T's inherent anti-competitive behavior.
  - New microwave communications technology, created long distance competition to AT&T, but to enable it, the DOJ had to sue and breakup AT&T into a long distance company, an equipment company, and seven local phone "Bells."
- When Congress passed the 1996 Telecom Act, the government's political grant of a national telephone monopoly ended and telecom competition was the new law of the land.
- Resultant facilities-based voice competition from cable, wireless, and Internet has led to a two-thirds loss in market share and created the predicate for ending common carrier regulation of voice like the Government ended common carrier regulation for railroads, trucking, buses and airlines.

The Law Ignores Five Technology Changes

1. The sea change from inefficient **analog** to ever-increasingly-efficient **digital** computer/Internet technologies;
2. The virtuous **Moore's Law** ~50 year trend of microchip performance doubling every ~18 months;
3. The virtuous **Cooper's Law** ~104 year trend of radio transmission efficiency doubling every ~30 months;
4. The virtuous steady efficiency gains in **digital compression innovation** that enable the same wire line or wireless spectrum to transmit increasingly more throughput or effective bandwidth over time; and
5. **Internet convergence** from *single*-service technology silos (telecom, broadcast, cable, satellite, & wireless) to *converged* voice/data/video services Internet technology platforms and facilities.

Five Ways the Law Has Held America Back

1. **Telephone service** changed little in 50 years;
   – (1934-1984);
2. **Cell phone** took 33 years to get to market;
   – (1949-1982);
3. **Internet packet-switching** took 25 years to commercialize;
   – (1969-1994);
4. **PC modem** took 25 years to be broadly commercialized;
   – (1977- 2002); &
5. **Broadband service** took 17 years to be broadly commercialized;
   – (1988-2005).

From Monopoly to Competitive Economics

- *Legacy* law assumes an <u>analog</u> electrical *continuous* voltage function technology.
  - For telecom that means dedicated continuous end-to-end telephone circuits between locations;
  - While very durable, the analog PSTN is highly-inefficient relative to digital networks.
- *Legacy* law does not explicitly recognize today's <u>digital</u> technology, which is the opposite of analog in being the discrete/*discontinuous* voltage technology function of computers;
  - A discrete, discontinuous technology is an infinitely interchangeable building-block technology;
  - Digital allows near infinite functional integration of data/voice/video and every info type;
  - Digital is orders of magnitude more efficient and functional than analog technology:
    - Digital harnesses Moore's Law doubling of chip performance every ~18 months, which creates a virtuous ever-increasing capability to get more efficiency/capacity out of the same wire/cable or radio spectrum over time.
- At bottom, with every Moore's Law cycle, digital tech has gotten at least twice as efficient as analog technology. To put this in perspective digital technology has gotten *at least*:
  - ~1,000 times more efficient since the 1996 Telecom Act;
  - ~8,000 times more efficient since the 1992 Cable Act, and
  - ~256,000 times more efficient since the 1984 breakup of AT&T and the 1984 Cable Act.
- Simply, the transition from analog continuous to digital discontinuous technology is a transition from analog monopoly economics to digital competitive economics because:
  - A national ~$200b analog continuous PSTN network worked most efficiently as a monopoly network because it was extremely complicated for <u>regulators</u> to unbundle competitively;
  - Whereas digital discontinuous Internet protocol technology enables <u>engineers</u> to easily and quickly configure devices, transmission technologies, and networks, increasingly efficiently over time.
  - **Digital technology enables robust facilities-based communications competition.**

What's the Harm from Obsolete Law?

1. Limits **user** benefits, savings & productivity
   – By discouraging adoption and commercialization of *existing* innovations;
2. Discourages *new* innovations for **users**
   – That could solve niche user wants, needs, and means with one-size-fits-all limits;
3. Slows technological, Internet and commercial progress
   – By forcing bandwidth performance to lag computing and storage performance;
4. Burdens investment and economic growth
   – By assuming analog monopolies and not digital competitive communications;
5. Renders infrastructure and property less valuable and attractive
   – As its usefulness can't stay current and competitive; and
6. Disadvantages American competitiveness
   – When foreign competitors aren't burdened with the same drag of obsolete law.

Spectrum Management Is an Historical Anomaly

To manage and conserve natural resources and Federal lands, Congress created the **Department of Interior** in 1849.

LAND

To more efficiently manage the Federal workforce, Congress created **the Civil Service Commission** in 1883 and modernized it in 1979 as the **Office of Personnel Management**

PERSONNEL

To efficiently manage costs and operations of Federal buildings, offices, and vehicles, Congress created the **General Services Administration (GSA)** in 1949.

BUILDINGS

To efficiently manage Government communications costs, the GSA created the Federal Telecom Service in 1960

TELECOM

To efficiently and effectively manage the nation's resources (except radio spectrum), Congress created the **Office of Management and Budget (OMB)** in the Executive Office of the President in 1970

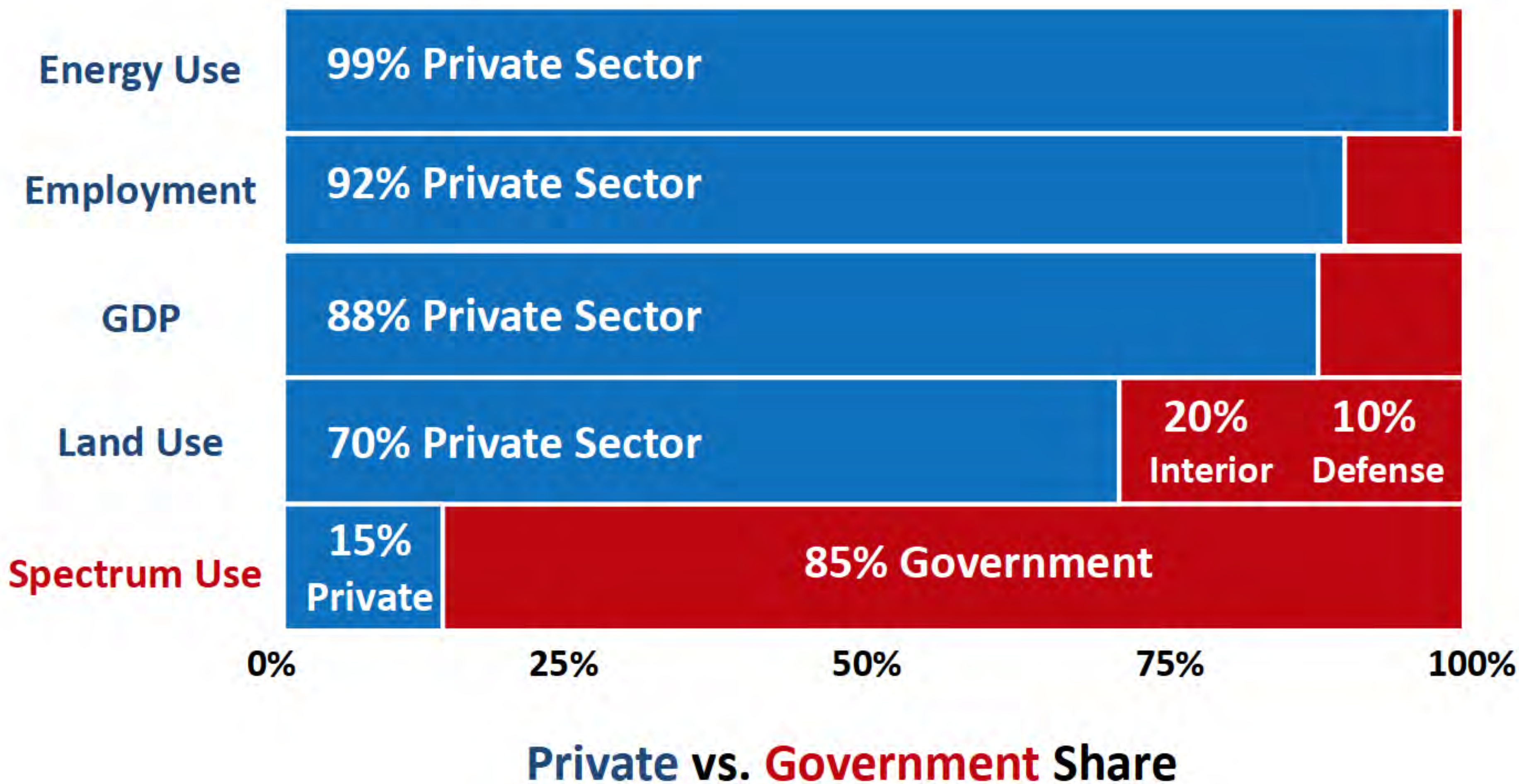
BUDGET

Still NO modern management of radio SPECTRUM In 2012

1850 1900 1950 2000

Sources: NTIA, U.S. Govt.

Spectrum Is a Resource Management Outlier



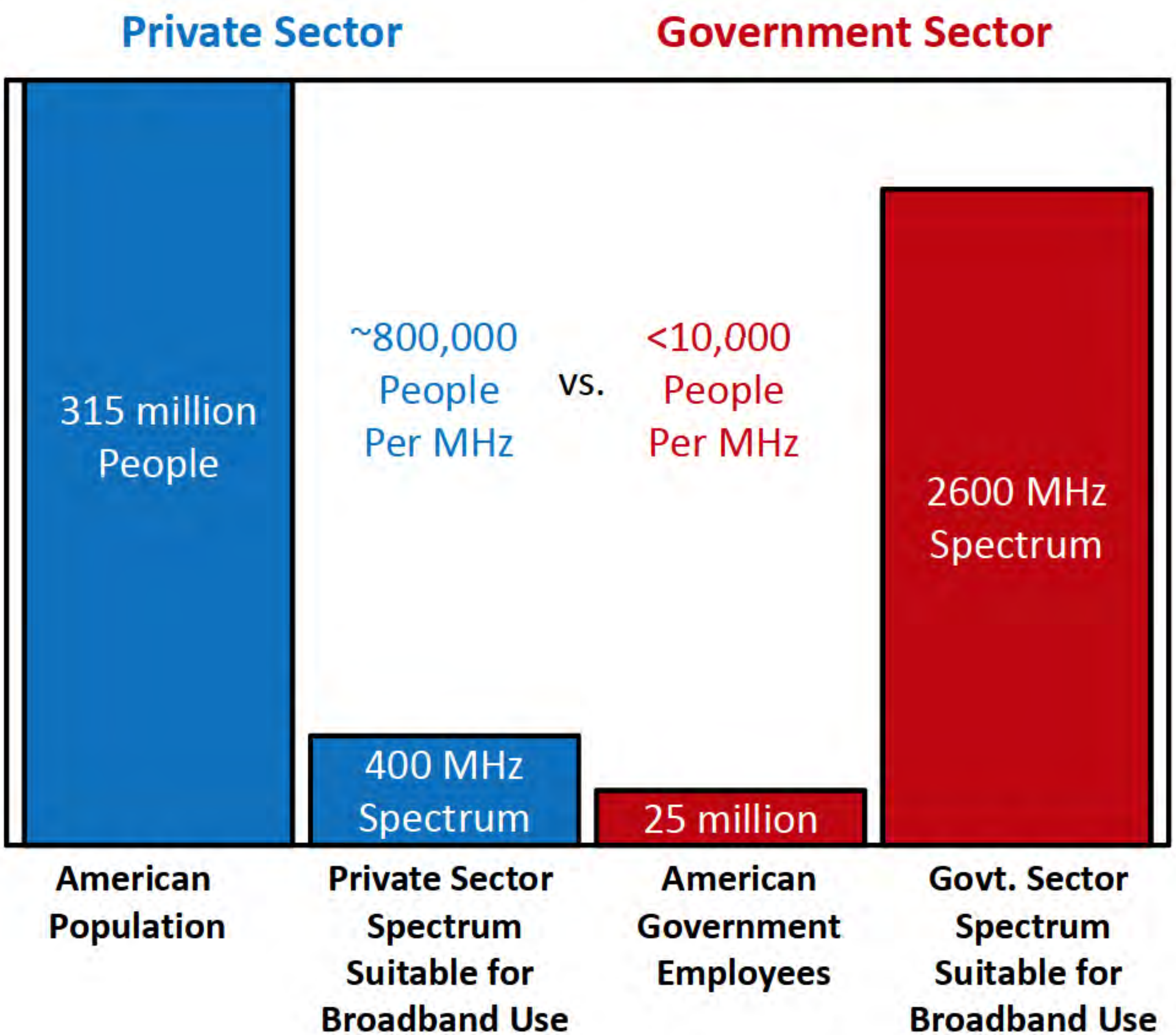
***Sources:** DOE, CEA, Interior, & NTIA*

Spectrum Is the Worst-Managed Resource

- Shockingly in 2012, there remains no accountable Federal manager of radio spectrum,
  - Despite spectrum being the 21st century's most valuable natural resource and the essential fuel of the private sector mobile technology revolution of smart phones, tablets and the Internet of things.
- Equally shocking is that the Federal Government's spectrum inventory management system hasn't changed materially since 1992, despite:
  - American wireless subscribers growing 3,000% from 11 million connections to 331 million;
  - Congress revolutionizing the economics of spectrum by mandating public auction of spectrum to the highest bidder; and
  - The exponential explosion of demand for wireless driven by: the Internet, smart phones, tablets, and video streaming technology.
- Most shocking of all is that a national resource that can enable a ~trillion dollars plus in economic activity is so wasted and backwardly-managed as if it is not important to America’s future.

Obvious Waste of Government Spectrum

Private Sector Spectrum Utilization is >80 Times Higher Than Government Sector



Note:
Over 100 years, 30 Government agencies incrementally received 3,000 spectrum allocations with minimal accountability or oversight

Sources:
U.S. Census Bureau, CEA, & NTIA

How Did This Anomaly Happen?

- The basic legal authority for the Federal Government to manage the inventory of radio spectrum and assign who can use what radio frequencies for what use is obsolete. It hasn't substantively changed since 1934, despite the:
  - Advent of the TV, radar, microwave communications, satellites, cell-, hones, the Internet, smart phones or tablets; and
  - Fact that these technology changes have created vastly more private sector demand for radio spectrum than there is supply for private sector use.
- The current Federal steward of radio frequency assignment authority is the low-level Office of Spectrum Management buried in the Office of the Assistant Secretary of Commerce for Communications and Information.
  - While ostensibly it has the responsibility for "managing" the Federal spectrum inventory and assignments, it has minimal legal or delegated authority, power, or clout to actually efficiently or effectively manage the Nation's spectrum for the benefit of the Nation or the U.S. taxpaying public.
  - In reality, they are a caretaker/bookkeeper of the nation's spectrum, not a manager of it; no one is.
- Since virtually all broadband-suitable frequencies have already been assigned to a government bureaucracy for free, the current ad hoc committee process of managing spectrum is dysfunctional, because it has those who already use the spectrum effectively deciding whether or not they have to give it up.
  - Not surprisingly, any government entity that was assigned a valuable frequency for free in the past -- long before spectrum became so valuable and scarce -- is loathe to give it up.
  - Moreover, they also appreciate that there is seldom anyone paying attention in the Executive Branch or Congress, which has the power to get it reassigned to a higher or better use.

Why is U.S. Spectrum Management Dysfunctional?

- There is no modern management of this resource or process.
  - No coherent Federal policy that spectrum is a valuable scarce resource that needs to be conserved, well-managed and put to its highest and best use for the Nation and the American taxpayer.
  - No OMB-level review -- independent of the departments and agencies that control the spectrum -- to verify that it is being responsibly managed.
  - No formal annual spectrum budget process in the executive or legislative branch, where Government spectrum holders have to justify their continued use of the spectrum, defend why they can't share their spectrum with other bureaucracies, or why they can't clear it for public auction.
  - No regular audit or official accountability process to ensure that this valuable spectrum is being efficiently-used, fully-utilized and not wasted.
  - No required economic opportunity-cost analysis or cost-benefit analysis of Federal spectrum use.
- As long as there is no requirement for Government bureaucracies to pay annually for the value enjoyed from their spectrum use, like they have to pay for the energy, personnel and other resources that they use, spectrum will be managed in a dysfunctional manner and bureaucracies will not understand or appreciate the alternative value this scarce resource has to the private sector.
  - Simply, if a valuable scarce resource is perpetually free to use by a lucky select few, it will be wasted and hoarded.

Conclusion

- Obsolete law/regulation/spectrum management increasingly is a:
  - **Dead end** with no future; it mandates that communications live in past;
  - **Unnecessary drag** slowing investment & innovation, as it forces innovation 'round pegs' into obsolete 'square holes;'
  - **Nonsensical waste** of precious time and resources, as it generates uncertainty, busy work, and red tape;
  - **Cost sinkhole** as it mandates subsidized obsolete service availability everywhere when demand is collapsing rapidly;
  - **Counter-productive** "government may I?' burden on too much communications-driven economic activity; and
  - **Absurdly dysfunctional** part of an otherwise efficient and free market Internet ecosystem.
- The status quo of U.S. communications policy has become an increasingly absurd "Rube Goldberg machine"
  - Of complex rules, regulations and red tape that make simple technological and business tasks unnecessarily convoluted and inefficient.
- **Bottom Line: U.S. Communications policy is in obvious and urgent need of modernization for the 21st Century Internet and mobile economy.**

Recommendations

Modernize Obsolete Law & Regulation

1. Modernize communications law/regulation to be consumer-centric and technology-neutral.
   - Don't premise future laws or regulations on *static technology-specific assumptions or policy* that will become obsolete with tech change, but on *dynamic technology-neutral assumptions or policy* that are unaffected by technology change.
   - If there is a need for a transitional technology-specific law/regulation it should be temporary and have a hard sunset date.
2. Proactively cull out legacy law and regulations that are a barrier to or impede the IP transition and competition; and ensure they are both sunset-ed and not applied to the Internet ecosystem.

Modernize Obsolete Government Spectrum Management

1. Get much more Government spectrum to private sector auction soonest.
   - The Government should reclaim **an additional 1650 MHz** of spectrum suitable for broadband use for private sector use by 2032 -- to transition from controlling 85% of the Nation's spectrum today to <30% by 2032.
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January 31, 2014

The Hon. Fred Upton
Chairman
House Energy and Commerce Committee
U.S. House of Representatives

The Hon. Greg Walden
Chairman
Communications and Technology Subcommittee
House Energy and Commerce Committee
U.S. House of Representatives

Dear Sirs:

Please accept these brief remarks for the record in response to the invitation in the "White Paper" released January 10, 2014, "[T]he committee will accept comments on any aspect of updating communications law. Please respond by January 31, 2014 to CommActUpdate@mail.house.gov."

To develop useful, effective and forward-looking communications policy it is necessary to look beyond the "PSTN transition" and into the next decade. In this light, I address four fundamental points: i) what is the emerging "broadband network"? ii) What should be the scope of broadband policy? iii) What is the role of the "public interest" in broadband policy? iv) What is the appropriate broadband policy/regulatory model? An elaboration of these points can be found in the accompanying paper.

i) Broadband Network. The emerging broadband network is not just the worldwide web, or the Internet, or all IP-traffic, or the public network. Its scope may include publicly and non-publicly accessible private platforms, networks, equipment, software, storage and websites which are not easily transparent to regulators but which, directly or indirectly, can affect the workings, economics or business models of the public Internet. It will also be integrated with power, transportation and medical networks, and the "internet of things" through a series of inter-cloud networks. A comprehensive policy needs to embrace the totality of the actors and factors affecting the broadband network.

ii) Policy Scope. If it is correctly argued that the emerging "broadband ecosystem" is co-extensive with actors and applications from multiple industry sectors operating at different layers (e.g., hardware, software, "cloud services", CDNs, applications and services providers, and content providers) which combine to create a market for a new broadband product, the "integrated platform", thus removing concerns about terminating monopolies, then the scope of the new policy needs to be co-extensive with the scope of the broadband ecosystem.

iii) Public Interest.

Historically, U.S. communications policy has integrated an array of normative (non-market-based) goals. These values have evolved as society, culture, technology and media have evolved. It is in times of fundamental change that it is especially important to reflect on those underlying values; however, U.S. communications policy has seen the gradual decline of the normative. The policy discourse has mainly been focused only on narrow issues and interests, without addressing values in their full social context. For example, the idea of the U.S. as a deliberative democracy has been at the heart of the public interest standard. Congress has recognized that the marketplace meets many but not all needs of democracy, and must include the participation of individuals as citizens, not just consumers. In this respect, the business of transporting communications has been seen as more than just an economic enterprise. "Policy makers face the challenge of understanding the underlying public interest values without blindly applying outmoded frameworks to new situations. They must also resist the fear that any intervention is inherently inferior to market forces." (Krasnow, 1997)

iv) Broadband Regulatory Model

The "broadband policy space" model recognizes that regulatory oversight authority will not be held within just one formal body, but may be dispersed between any number of entities, both private and public. The "policy space" metaphor allows for a more complex mix of policy and regulatory activity. It can accommodate a variety of policy and regulatory tools, and enables different jurisdictional responses to similar policy objectives. The broadband policy space approach transforms the idea of the discipline of the market as being separate from policy. Instead, it sees the market as another policy instrument within the space. The goal of policy would be to assure and promote competition in the broadband ecosystem. Its primary tool is transparency in the market, especially with respect to consumers. It calls for the maximum scope of jurisdiction combined with minimum levels of intervention in cases of threats to competition or to advance Congress' normative policy goals. Agencies charged with carrying out Congressional intent should be instructed to choose the least intrusive tool that can reasonably be expected to accomplish the stated goal(s). The federal broadband policy space can be envisioned as a combination of agencies, under the direction of Congress, e.g., the FCC, the FTC and the Justice Department, combined with areas of self-regulation and co-regulation, deregulation, and the promotion of competition.

The above points are elaborated, with citations, in the paper, "*Competition vs. Regulation in the Post-Sunset PSTN*," presented at the TPRC 2013 conference, which I have attached and incorporate by reference. Thank you for this opportunity to submit these brief comments on behalf of myself and all current and future users of the broadband network.

Sincerely,

Richard D. Taylor

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Co-Founder and Co-Editor-in-Chief, Journal of Information Policy (http://jip-online.org/)
The Pennsylvania State University (On sabbatical academic year 2013-2014)

COMPETITION VERSUS REGULATION IN THE POST-SUNSET PSTN

By

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The Pennsylvania State University

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Ph.D. student, Pennsylvania State University

TPRC
41st Research Conference on Communication, Information and Internet Policy
September 27-29, 2013
George Mason University School of Law, Arlington, Virginia

COMPETITION VERSUS REGULATION IN THE POST-SUNSET PSTN

This paper proposes a new framework to address competition, consumer protection and public interest concerns in a "post-sunset" PSTN broadband ecosystem" (BE). In the BE, enterprises are connected horizontally and vertically. Envisioning those enterprises as points within a three-dimensional lattice, it models a way to balance promotion of competition with a range of policies of governance in the absence of competition. This is a response to the current regulators' dilemma that companies like Google, Facebook, Amazon, Apple, Microsoft and others are now in many of the same markets as companies which were once primarily carriers such as AT&T, Verizon, Time Warner and Comcast, which are now rapidly diversifying and fleeing into an unregulated all-IP mode.

The FCC's National Broadband Plan (NBP) envisions ubiquitous broadband access in the U.S., accomplished by a transition from traditional telephone technology – analog circuits, TDM switches, related infrastructure components – to an Internet Protocol (IP)-based national broadband network. However, the NBP does not specify a specific migration path from the old network to the new one, leaving critical questions of technology, business and regulation unanswered. The FCC and the market are now in a race to see which will answer them first.

This transition is being "forced" by old TDM equipment reaching end-of-life and by large numbers of customers migrating away from traditional wireline voice communications and substituting mobile, VoIP and other alternatives. As the subscriber base declines, but the cost of maintaining the old network is fixed (or increasing), the cost per customer rises and profitability decreases, creating a voice "death spiral". The major telecommunications carriers are already rapidly distancing themselves from the "old" telecommunications service and moving to diversified IP-based services.

In the technical area there are transition questions about numbering, interconnection and interoperability, quality of service, and spectrum among others. From the business perspective, traditional carriers are faced with finding new business models to function in what can be described as a three-dimensional lattice that comprises the metastructure of the BE. From a regulatory perspective, there is a fundamental challenge as to whether the FCC has any jurisdiction over IP-based services at all under current rules. A long-term solution to these problems requires a new way of thinking about the structure of the market as implemented consistent with the NBP.

The FCC has initiated a process to consider this, within the presumed scope of its current jurisdiction, although it may ultimately require Congress or the courts to define that scope. At the same time, the major carriers such as AT&T, Verizon, Time Warner and Comcast have initiated an aggressive campaign to have all IP-based services deregulated as "information services". Arrayed against this are civil society/public interest organizations devoted to sustaining the traditional "social contract" with respect to communications in the public interest.

The ultimate outcome is uncertain, but it appears neither side has the political influence to win a total victory. Given that, some policy experts are proposing a "middle way" in which the broadband network evolves against a set of general principles to assure competition and protect the public interest. This could involve an ex ante anti-trust/consumer protection approach, or a light-touch version of traditional regulation. However, there is as yet no coherent theoretical framework within which to decide what action (or forbearance) is appropriate under what conditions. This paper's three-dimensional lattice model is a step in that direction.

COMPETITION VERSUS REGULATION IN THE POST-SUNSET PSTN

1. INTRODUCTION

The U.S. telecommunications network is undergoing an epochal transition. Some may see it as merely being about "just a different signaling protocol," (Bookman, 2013) but the implications for business, regulation and society are sweeping and potentially transformative. These changes raise a wide array of difficult questions with as-yet uncertain answers (Taylor, 2013). This paper focuses on the area of policy and regulation. The emerging broadband ecosystem does not fit neatly into any prior regulatory model (e.g., "silos", "layers"), requiring both a look back to consider fundamental normative principles and a look ahead beyond legacy regulations to a new policy landscape.

This paper calls first for restating the normative basis of communications policy (referred to as the "social contract" or the "public interest"). It then addresses the balance of competition and regulation. It proposes a new model of the broadband ecosystem, the "latticed structural model," co-evolving with a new "broadband policy space" model. It then offers specific implementations in a proposed new Title VIII of the Communications Act, "Broadband Networks".

1.1 Congress Calls for a National Plan[1]

On March 16, 2010, the U.S. Federal Communications Commission released "*Connecting America: The National Broadband Plan*" (FCC, NBP, 2010). This plan was developed pursuant a mandate from the U.S. Congress contained in the 2009 "American Recovery and Reinvestment Act" (U.S., ARRA, 2009). The goal of the plan was to map a strategy which would, by 2020, convert the U.S. telecommunications system into an IP-based broadband network accessible to all Americans. While the ARRA required the FCC to develop the plan, it did not give it open-ended authority to implement it.

The NBP primarily relied on market forces to reach its goals for broadband penetration. Investment by private companies in fiber optic, co-axial, broadband DSL and broadband mobile systems would provide the majority of national coverage. The government would play a role only in those situations where market forces were unlikely to provide a minimum level of broadband access at an affordable price, or where important public policy goals were at stake.

The FCC delivered the NBP to Congress as directed, but due to uncertainty about the Commission's statutory jurisdiction, especially over broadband networks providing "information

[1] Sections 1.1 – 1.3 are adapted from Taylor, R. (2013). *Issues in the Transition of the U.S. PSTN from TDM to IP*. International Telecommunications Society, Perth, Australia, August 2013, which addresses the whole range of issues in the transition and which can be accessed at http://psu-us.academia.edu/RichardTaylor/.

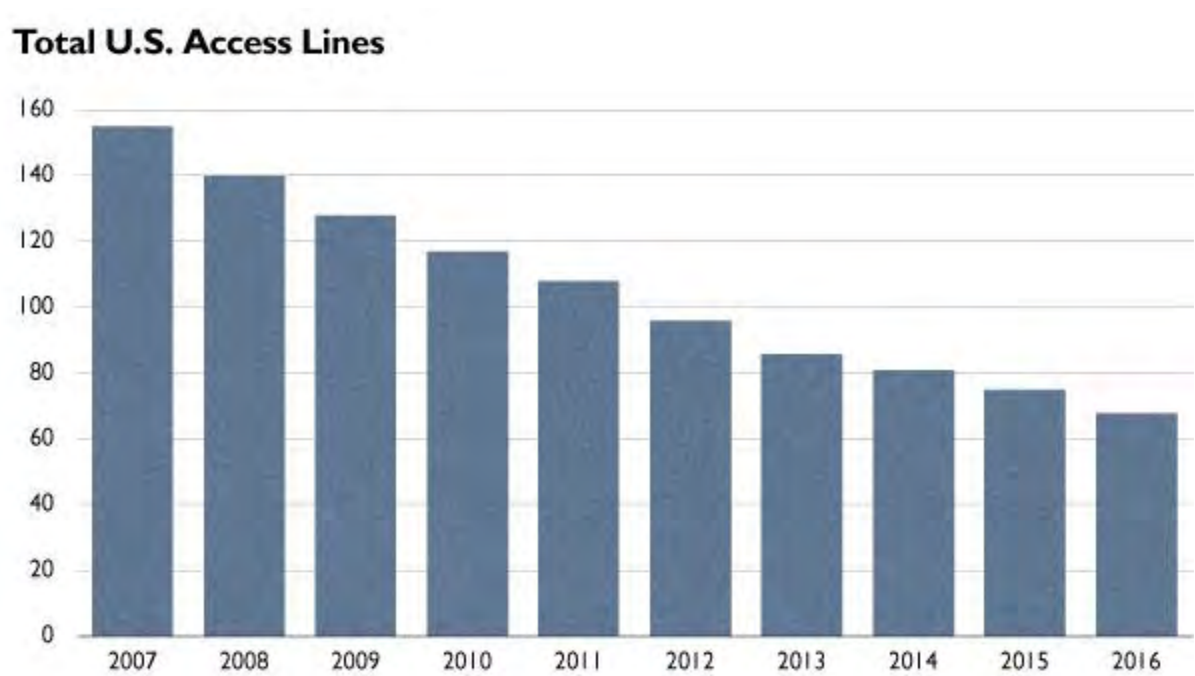
services," additional Congressional action may be required to implement important parts of the Plan. However, the national political situation in the United States during the last several years has been so polarized as to result in legislative gridlock, making the outlook for such action in the near future uncertain.

While Congress is not engaged, however, technology and markets are moving rapidly forward, making many existing structures and policies – technical, market and regulatory – obsolete. Under these circumstances, the FCC is attempting to do what it can within its current powers to adapt and prepare for a different kind of information infrastructure – a national broadband network. The challenges are, first, making the transition from the existing TDM-based telephone system to an IP-based broadband network, but second, and perhaps more importantly, envisioning what happens after that transition is completed.

1.2 Decline of the U.S. Public Switched Telephone Network (PSTN)

There has been a steady decline in U.S. residential connections for traditional wireline voice telephony. (See Figure 1)

Figure 1. Total U.S. Access lines 2007-2016



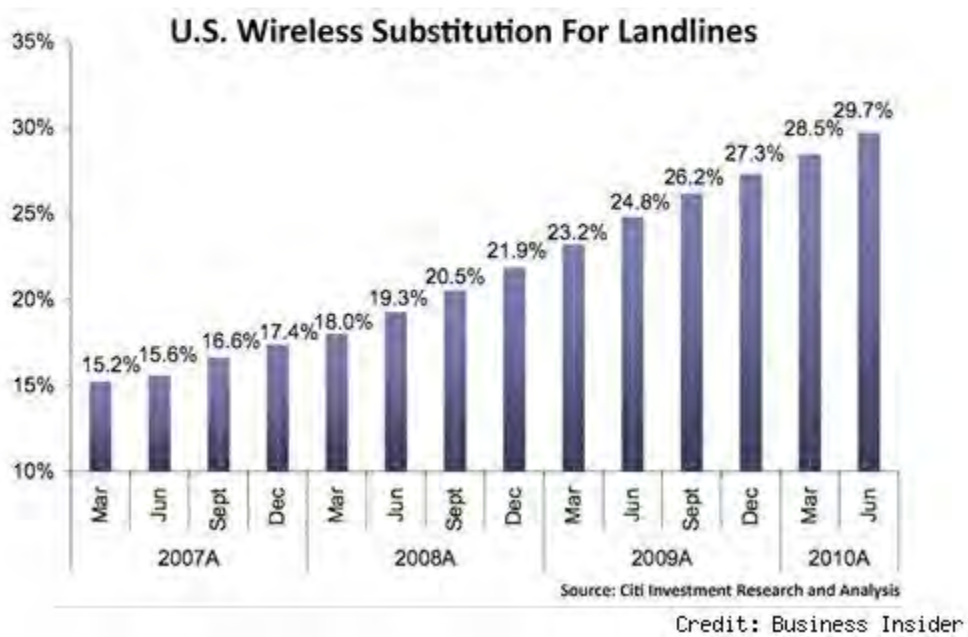
Kim, G. (2012) citing Allied Telesis.
http://ipcarrier.blogspot.com/2012/08/will-fixed-network-voice-connections.html

Nearly 70% of residential voice consumers have already migrated away from POTS ("Plain Old Telephone Service") service. Half of all adults under 35 now live in households without wireline phone service. With the advent of more "VoIP" non-telephony calling applications, the impact on businesses has been similar. Businesses need fewer trunks to their PBX since there are fewer calls. (Kranky, 2012) While the use of IP telephony and VoIP connections grew 17 percent from 29 million to 34 million, retail switched access lines decreased 8 percent, from 122 million to 112 million, between June 2010 and June 2011.

The mobile telecommunications industry trade association, CTIA, estimates that 31% of America's 110 million households (around 35 million) are now wireline free (Toor, 2010). It is estimated that by 2022 the US will have only 55 million wirelines left, a decrease of 43 million lines from 2012's 98 million lines.

At some point, service providers will find the cost of maintaining aging systems and switches to be excessive, and the ability to further maximize efficiency (with fewer staff) difficult, if not impossible. CTIA data for 2011 show 331.6 million mobile subscribers. That suggests something on the order of 443.6 million voice accounts in service, of which wireless represents 75 percent of all U.S. voice lines in service. (See Figure 2)

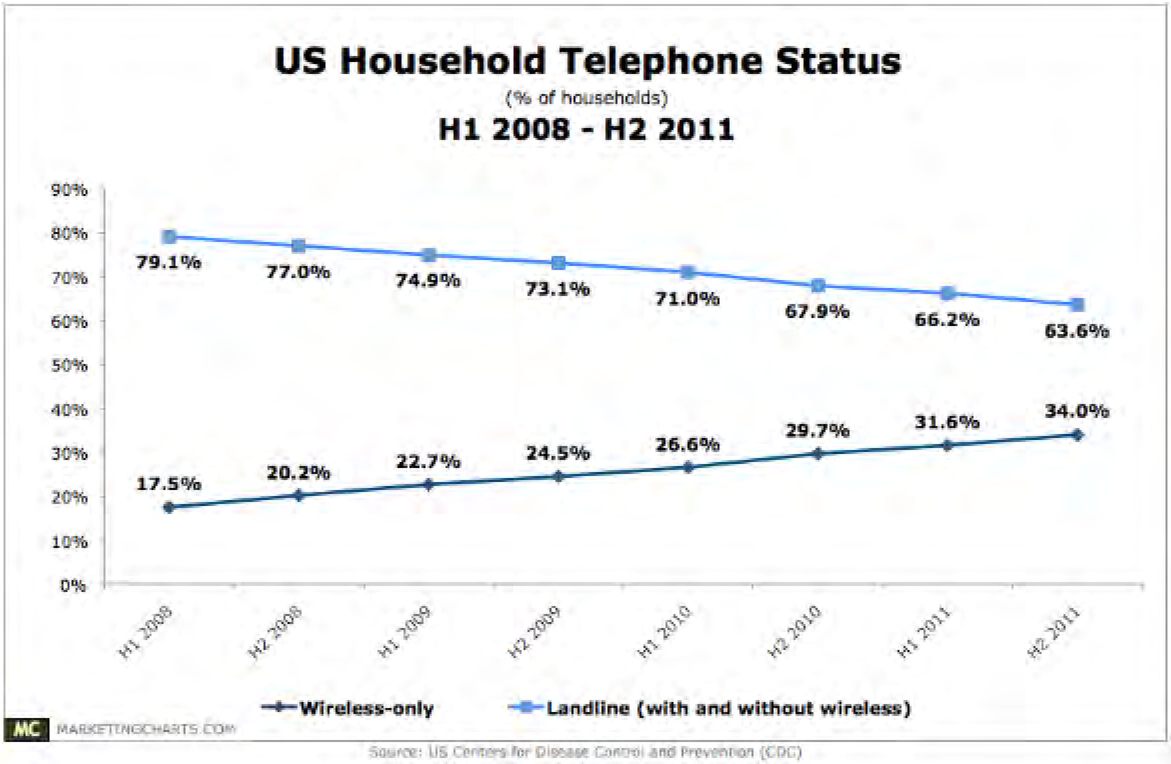
Figure 2. U.S. Wireless Substitution for Landlines, 2007A-2010W



Toor, A., 2010.
http://www.switched.com/2010/08/19/one-third-of-u-s-families-live-without-landline-phones-report/

Figure 3, below, reflects the steady trend towards substitution of mobile and VoIP for traditional PSTN service.

Figure 3. U.S. Household Telephone Status (% of Households) H1 2008-H2 2011



Marketing Charts Staff, 2012.
http://www.marketingcharts.com/wp/direct/landline-phone-penetration-dwindles-as-cell-only-households-grow-22577/

The cost of maintaining the PSTN remains relatively stable. However, as the number of users declines, the cost per user rises, burdening the remaining users with progressively higher costs and rates. As time goes by, this business model becomes less and less tenable, while requiring investment in the old network decreases the amount available for investment in upgraded or new IP-based broadband networks. For this reason U.S. carriers, and AT&T in particular, are seeking regulatory relief from some or all of the regulatory obligations which are in place to sustain the obsolescent PSTN.

The FCC and the telecommunications industry have begun the process of transitioning from Time Division Multiplexing (TDM) and Signaling System 7 (SS7) to all-IP technologies over a ubiquitous national broadband network and all-IP interconnection. The transition will be a highly complex process that will take years, involve huge investments and retire tens of billions of dollars of existing infrastructure and replace it with digital technology. Along with these technical changes come foundational changes in the traditional bases of the FCC's jurisdiction both in telecommunications and broadcasting, which are discussed further in Sec. 4.1.

Given the magnitude of this change, not just in dollars, but in social implications, it is important to step back and review the fundamental values which underlie the American telecommunications system.

2.0 RESTATING THE NORMATIVE LINK

2.1 American Values

The concept of the "normative" is about values. It is about how things ought to be, and what things are good or bad. (Duff, 2012) It can be absolute, seeking universal values which apply across cultures, anchored in ultimate ends. Or it can be social, grounded in the values of a particular culture or nation, seeking to assert that society's highest ideals. In the context of this discussion, "normative" is used in the latter sense. It looks at what we have chosen in the U.S. Other countries may differ in significant ways (see, e.g., Fourie, 2007). It considers what we value in American culture, and how we have expressed it in the area of communications policy.

Historically, U.S. communications policy has integrated an array of normative (non-market-based) goals. These values have evolved as society, culture, technology and media have evolved. However, to acknowledge that these values have evolved to adapt to meet new social and technological forms is far from saying there are no such values. It is in times of major, fundamental change that it is especially important to reflect on those underlying normative values; however, U.S. communications policy has seen the gradual decline of the normative. The policy discourse has mainly been focused only narrow issues and interests, without contextualizing them in their full social context. As a result, we face a normative crisis – will we abandon our traditional social values wholesale? (Duff, 2008)

Normative values are typically expressed in non-economic terms: freedom, liberty, democracy, justice, fairness, and equality are examples of long and deeply held values; however, they are not typically values to which we assign precise dollar amounts. Likewise, in communications, there have been consistent expressions of social values articulated in public policies to which we have unfailingly recurred from the earliest days of electronic communications. Historically, U.S. communications policy has been grounded in a vision of a better society. (Bauer, 2002)

Politics is all about the normative. Values precede policy choices. It is distinctly the role and duty of Congress to make normative judgments, and to implement them through policies, budgets and expert agencies. Policies then tend to be inherently prescriptive; they follow the normative. Social sciences and economics can track the success of such strategies, but do not set their direction. (Jordana, 2002) When rights and values conflict in a democracy, the democratic process is the proper place to seek the balance.

Historically, the U.S. has recognized a range of normative goals in communications (see Sec. 2.2, below). However, the current mainstream policy discourse over the broadband ecosystem revolves primarily around economics, or, more precisely, economic arguments. It has been said that economics has no normative concerns, but economists do, and that neo-classical economics "knows the price of everything and the value of nothing". (Jordana, 2002) If there are no "normative" judgments to be made, then setting policy solely based on economics becomes the default position. But politics is not just economics. Some still believe democratic society expresses its preferences through government, while others believe there should not be any framework set by government and everything should be left to the working of the market. The latter is, at its heart, a profoundly anti-democratic concept. Which of those positions is adopted by Congress will define the future direction of broadband policy – with or without a normative social vision and values.

If we are to go forward on a normative basis, we need to ascertain from past practice what values have been embodied in prior communications policy, and consider how, if we still consider them relevant and appropriate, they might be carried forward into a very new communications environment.

Congress has traditionally embodied its normative goals in broad language in legislation. In 1934 Congress provided the communications industries and communications regulators with a simple yet compelling vision for the promise of communications in this country: "to make available, so far as possible, to all the people of the United States a rapid, efficient, nationwide and world-wide wire and radio communications service with adequate facilities at reasonable charges." (Cate, 1993; U.S., Communications Act) Implementing this overall directive, the FCC embarked on the creation and regulation of the largest, most advanced communications system in the world. The Commission's decisions were to be guided by "public convenience, interest, or necessity". (Schultze, 2008)

The telephone and telegraph were classified under the Communications Act's "Title II – Common Carriers", and broadcasting fell under "Title III – Radio." In 1984, Congress added Title VI to cover the (then) new cable television industry. Title VI did not carry its own express "public interest" provision, but had as a stated goal to "assure that cable communications provide and are encouraged to provide the widest possible diversity of information sources and services to the public."

American communications law has placed the public interest at its core. The phrase appears nearly one hundred times in the current version of the Communications Act. Congress requires the FCC to justify all its rules as serving the public interest. (Schultze, 2008) Pursuant to this guidance, the Commission has, over time, evolved regulations for the purpose of achieving those goals. However, the changing communications landscape draws into question how (or if) the current rules may apply in the future. According to Blair Levin, one of the principle architects of the National Broadband Plan:

> *For a century, our country has benefited from a communications social contract in telephone, broadcast, and multi-channel video in which through law, regulation, and franchise agreements, providers obtain public benefits in exchange for providing certain, limited public obligations. But how will we write the terms of the social contract between communities and communications providers in building the next infrastructure of world-class IP communications for the 21st century?* (Levin, 2012)

He then suggested that some historical implementations of the public interest are mismatched with tomorrow's broadband ecosystem and the needs of tomorrow's society

2.2 The Public Interest

The principle of the "public interest" has been critiqued, minimized and even ridiculed. For example, former FCC Chairman Michael Powell was famously <u>NOT</u> visited by the "angel of the public interest" when he was appointed (Schultze, 2008) (although he did express his normative values in his concern about the "Mercedes Divide"). Former Chairman Mark Fowler believed "the public's interest defines the public interest". (Schultze, 2008) Others believe the public interest is whatever the public says it is by "the interaction of millions of diverse interests and actors in a free marketplace". (Cato, 2003) To assert this is to gut the term of any meaning – and to assume Congress meant nothing when it included this language. More fittingly, according to former Commissioner Ervin Duggan, the standard has encompassed different things at different times. It is dependent on a consensus which must be repeatedly fashioned anew from competing values and interests. (Schultze, 2008) Defining the "public interest" at any given point in time is to invite a healthy debate about public values.

In the literature, the "public interest" concept has been subject to several interpretations, which largely fall into three schools: i) it is "charismatic" and represents the "highest standard" (Lefevre-Gonzalez, 2013); ii) it is "empty", "manipulable", "indiscernible" and "a charade" (Cato, 2003; Schultze, 2008)); and iii) it is a false flag behind which corporate interests hide to advance their financial interests (Lefevre-Gonzalez, 2013). For example, communications scholar Ben Compaine notes that the standard is empty because there is no single "public": there are many publics, and they have many interests. (Lehman, 2005) There may indeed be many "publics," but that in no way refutes that there is a common interest in many things (e.g., clean air, clean water). Indeed, the idea of a "minority public interest" is something of an oxymoron. Although there may be some constituencies which question government's involvement in such shared concerns, Congress has found there is indeed a "public interest".

Economist Ronald Coase has noted that the phrase lacks "definite meaning" and provides no fixed standard. (Lehman, 2005; Thierer, 2008) However, the "public interest" is not meant to be narrow, precise and legalistic; it is an aspirational standard of behavior. It is hardly surprising that its implementations evolve with the society, culture, economy, policies, and business models of changing times. The Communications Act recognizes the possibility of the evolution of policies, such as in the evolving standards for "universal service" and "advanced services".

Another inherent policy tension has been about how to reconcile competing commercial pressures with the needs of democracy. This involves democratic theory, not just economic theory. The idea of the U.S. as a deliberative democracy has been at the heart of the public interest standard (especially in broadcasting). (Advisory Committee, 2008) Congress has recognized that the marketplace meets many but not all needs of democracy, and must include the participation of individuals as citizens, not just consumers. In this respect, the business of transporting communications has been seen as more than just an economic enterprise

The Presidential Advisory Committee on the Obligations of Digital Broadcasters noted the history, and then took a view towards the future:

> *Although some of its specific applications have been controversial, the public interest standard is widely accepted as integral to broadcasting. The standard provides the legal basis for promoting greater diversity in programming, more robust political discussion,*

> *candidate access to the airwaves, programming that serves local communities, children's educational programming, access to programming for Americans with disabilities, and equal employment opportunities within broadcasting. . . [T]he times demand a thoughtful re-engagement with the meaning of the public interest standard. Many existing principles of public interest performance will likely need new interpretations in light of the new technology, market conditions, and cultural needs.* (Advisory Committee, 2008)

The Committee concluded that, "Policy makers face the challenge of understanding the underlying public interest values without blindly applying outmoded frameworks to new situations. They must also resist the fear that any intervention is inherently inferior to market forces. A holistic approach to media policy for the broadband ecosystem embraces both public interest obligations as well as the enhancement of competition in a healthy industry. (Advisory Committee, 2008) For a fuller treatment of history and analysis with respect to the concept of the "public interest" as applied in broadcasting, see Krasnow's briefing paper for this Committee. (Krasnow, 1997)

In general, the following are good candidates for inclusion in any list of traditional "normative" requirements which are in place within the current scope of the jurisdiction of the FCC:

- *Telecommunications*: universality (ubiquity); interconnection (unitary network); non-discrimination; competition; affordable access for all to comparable basic service; ability of users to connect non-harmful devices; rural and high-cost subsidies; consumer protection; network security and reliability; public safety; service to those with disabilities; ability to distribute and access all legal content.

- *Radio*: "Public trustee" spectrum management and licensing; preservation of "free TV"; localism; diversity; ownership and control limitations; indecency; advertising; political campaign speech; children's educational programming; accessibility for handicapped; equal opportunity.

This list is not meant to be all-inclusive, as there may be others which it would be appropriate to add. Which of these long-standing policies should be adopted, or which should be abandoned, in the new national broadband network?

3.0 COMPETITION VS. REGULATION

3.1 Efficiency and Policy

Competition has many virtues and many benefits for consumers, e.g., lower prices, more choice, more innovation, better service. Competition also drives investment. Real competition, in which all buyers are well-informed and have access to a choice among many competing sellers offering identical or fungible products, solves many regulatory problems. However, the real world does not often work that way, and few would argue that it is a good description of the current telecommunications market. Communications policies must have as a signal priority the promotion and maintenance of the highest level of competition; and where competition "fails" for whatever reason (i.e., fails to conform to market and/or policy objectives), to be able to address that failure in the least intrusive way with a minimum of harm to competition.

Market regulation is important for safeguarding against monopoly formation, the overall stability of markets, avoiding environmental harm, and ensuring a variety of social protections. There is a fine balance between policy goals that are often seen as conflicting. According to Prof. Bronwyn Howell:

> *From an economic perspective, efficiency is the defining performance benchmark for any industry or sector – not least telecommunications. For some economists, "efficiency" is the only "normative" standard. Consequently, the primary normative objective of law- and policy-making is the promotion of economic efficiency (in both its static and dynamic forms) via the elimination of market inefficiencies. A minority of economists, and many consumer advocates, propose the use of law- and policy-making powers principally as a means of achieving distributional objectives, independent of their effects upon total efficiency. Some argue that economic efficiency is the sole metric for formulating public policy. Policy makers repeatedly show that they have other objectives when formulating policy.* (Howell, 2010, citations omitted)

For example, equity, fairness and democratic participation are often goals of public policy. However, it is doubtful that many current policies would pass an economist's cost-benefit analysis. It is unlikely that any social safety net could pass an economic efficiency test. Most economists take for granted the idea that equity and efficiency cannot be achieved together. (Blank, 2002) At the same time, policy makers express normative goals that may not maximize efficiency but which reflect social values.[2]

Economic regulation has been established as a last resort for those markets where it is clear that competitive outcomes cannot be achieved by market forces; where deviation from economic efficiency is deemed socially desirable; where the social and private benefits are clearly different, including cases in which minimum safety standards increase social welfare; and to allow for coordination in technical standards or market equilibrium. (Economides, 2004)

3.2 Economics and Policy Formation

The study of economics has provided great benefits to society, and economists have made important contributions to society's understanding of markets and economic behavior. It is with the greatest respect for that rich and diverse tradition that the following qualifications are offered with respect to the democratic policy process in general, and to telecommunications policy in particular.

Economists play many roles in addition to that of independent scholars making objective, evidence-based judgments. They also work in government, media, business and industry, often on a consulting basis. Consequently it is appropriate to consider whether their economic judgments can sometimes amount to advocacy for the views of their sponsors. There is nothing

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[2] A curious example is the case of cigarette smoking, in which it has been shown that early deaths from smoking actually save society money, yet public money continues to be spent to dissuade smokers from their path.

wrong with that – the "marketplace of ideas" flourishes with contesting ideas – but that role needs to be acknowledged, especially in the policy discourse. There are many "voices" in the policy process, lawyers, for example, but the latter tend to be more transparent with respect to their advocacy for their clients.

If the only judgments that need to be made are economic, a body of economic experts could make all the policy decisions. We would need no politicians or elections, just economists. But what would we do if the economists couldn't agree (e.g., on the best remedy for the U.S. economy)? Would we not have to fall back on normative judgments? Are quantitative methods a substitute for values? Is "the market" an end or a means? Is the "ship of state" on automatic pilot (markets only) or should social values be reflected? These are core normative policy questions.

There has been no lack of academic critiques of regulation. Sometimes, perhaps the critiques based on scholarship have been "kidnapped" by those who oppose regulation purely on ideological grounds. (Mayo, 2011) This leads to the confounding of legitimate academic scrutiny of the economic merits of an imperfect regulatory mechanism with arguments by those who philosophically oppose any regulation on ideological grounds as a fundamentally coercive impediment to "freedom." Thus, while it is not always a central part of the explicit rhetoric regarding the desire to move toward a more market-oriented, less regulatory environment, the subtle (or not so subtle) sway of the ideological may be in the background of many economic arguments. (Mayo, 2011) This is the difference between the advocacy for a single client or cause or decision, and the advocacy of an overarching political model of society.

The many and often diverse opinions of economists are important inputs into public and communications policy. However, is it not fair to ask if economists who practice their craft as paid consultants are immune from the same economic incentives they say affect legislatures and regulators? They have much to say about "regulatory capture", or "political capture", but what about "economists capture" by "special interests". Do economists-for-hire themselves not respond to economic incentives? Accordingly, one might approach such economic policy advice with perspective, if not skepticism, once it goes beyond the descriptive and proposes preferred remedies. For some, when faced with the normative, all questions are answered with economics and "the market," but as has been said in another context, if the only tool you have is a hammer, everything looks like a nail. (Maslow, 1966)

But beyond economic issues lie the Internet's effects on society. Conservatives see the high-speed Internet as a tool for individual empowerment, allowing people to pursue their own interests and achieve their own excellence, acquiring knowledge and skills, starting businesses or otherwise seeking opportunity, formulating plans that take risks in pursuit of prospective reward. In contrast, the progressive concept of political empowerment sees the broadband Internet as a source of countervailing power for typically unorganized constituencies among consumers, citizens, or workers. Both, in their own ways, acknowledge its fundamental social importance.

According to Stephen Schulze:

> *We stand at a crossroads in media policy. On the one hand, we can surrender communications policy completely to competition policy. Down this path lies great uncertainty. What constitutes fair competition? How do we define the markets? What ensures welfare-enhancing access to users and uses of the network? On the other hand, we can incorporate public interest principles that have guided communications policy for decades, while being mindful of market incentives. This path does not provide us with the quantitative comfort of economic equations. However, it does not lull us into the perception that what we value in communications is always strictly quantifiable. After all, "the public interest" has remained flexible for a reason – media change.*

Even in an entirely new context, Prof. Robin Mansell reminds us, intermediaries will have a strong incentive to create artificial scarcity to protect their old ways of doing business. They may think that they know what users want, or they may decide that a particular set of uses will be more profitable and use their privileged positions to dictate outcomes. There is no inherent reason, she explains, that new technologies will be able to overcome those tendencies to introducing self-interested scarcity. This is where competition law becomes important, but it too has its downside. (Schulze, 2008)

Many believe that antitrust can become an excuse for doing nothing. Economists and lawyers seem to come up with endless ways of slicing the relevant markets to support their particular conclusions. The phrase "free market" becomes a euphemism for "never regulate." (Schulze, 2008) To some, proposals that we exclude *ex ante* rulemakings in favor of *ex post* enforcement seem like a recipe for doing nothing at all. Even a policy system with a "light touch" needs to be informed and aware not just of past, but of potential problems, and be able to react to them in a meaningful way.

Some would say just leave this to the Justice Department anti-trust division. It may be that regulatory agencies are no better at assessing narrowly conceived anticompetitive conduct than the antitrust agencies – indeed they may be worse. However, regulatory agencies tend to take a more holistic view of markets and social considerations than antitrust agencies. For antitrust to remain relevant in broadband policy – whether it is enforced via the antitrust agencies or regulatory agencies – it must consider the multi-sided, dynamic, platform-oriented nature of the broadband market. It may well be that regulatory agencies that consider the broad nature of the market are better situated to assess and control the deleterious economic effects of gatekeeper conduct than are the specific antitrust agencies. (Schulze, 2008)

4.0 PRINCIPLES-BASED APPROACHES TO THE BROADBAND ECOSYSTEM

4.1 Shortcomings of Current Communications Regulatory Models

Generally speaking, communications policy currently offers two basic regulatory models, each of which has serious limitations in the context of the broadband ecosystem. These are the sectoral model, based on technologies, and the "layered" model, based on the layers in a "protocol stack" in a transmission algorithm (e.g., IP, OSI).[3]

[3] See, for example, TCP/IP vs. OSI Protocol Stacks at http://bpastudio.csudh.edu/fac/lpress/471/hout/netech/tcpvOSI htm

4.1.1 *Sectoral*: ("Silos"). This is the model currently embodied in the Communications Act and FCC regulations. Sectoral regulatory categories are primarily based on technologies, e.g., telecommunications, radio, cable, satellite, wireless, etc. The broadband ecosystem will completely confound these distinctions. For example, broadcast licensing is based on the idea of spectrum scarcity. But if future "broadcasting" doesn't use spectrum, what is the basis (if any) of regulation. If "information services" (which will embrace virtually all traditional services) are not telecommunications, what (if any) is the basis of its regulation? The old silos become relatively meaningless in the era of the broadband network.

4.1.2 *Layered*: ("Protocol Stack"). This model proposes that the scope of regulatory authority and implementation be based on the different technical capacities represented by the different "layers" of a "protocol stack" which represent the different functionalities of each layer (e.g., link layer, internet layer, transport layer, application layer, or the seven layers of the OSI model). This has been criticized (Reed, 2006) on economic, technical and public policy grounds as both overly complex and too rigid and inconsistent with market realities.

A third alternative, a "latticed structural model" is proposed below. Because (to the best of our knowledge) it is entirely new, we believe it deserves a fuller exposition, which it receives below. But first we turn briefly to the idea of principles-based regulation as a guide to making the transition.

4.2 Principles-Based Transition Proposals

There is already some movement towards recognition of the value of broad normative standards in regulation during the transition, although so far it has not been applied to the entire broadband ecosystem post-transition. The need for overarching normative rules has become evident in the broadband ecosystem policy discussion. On the one side, there are those who support continued regulation of carriers as quasi-common carriers, and on the other, those who seek extensive, if not total, deregulation. A third approach has emerged for the transition, which observes that the situation is so complex, and the politics on both sides so intense and divergent, that neither of these two approaches is likely to fully prevail. It suggests that instead of adopting detailed regulations, perhaps prematurely, that Congress and the FCC adopt a set of general principles that could be implemented as needed on a case by case basis.

One example of this comes from a non-profit advocacy group called Public Knowledge, which puts forward five fundamental overarching principles:

1. *Service to all Americans*. All Americans, regardless of race, sex, income level or geographic location, participate in and benefit from any upgrades to our telecommunications networks.
2. *Interconnection and competition*. The FCC must make sure that the IP universe supports competition and requires interconnection among providers.
3. *Consumer Protection*. Consumers must not lose their existing protections because of the change in phone technology.

4. *Network Reliability*. Above all else, the phone network actually works. It does so repeatedly, time after time after time, in the same predictable and reliable way. That needs to keep happening. The all-IP network must be as reliable as the traditional phone network.
5. *Public Safety*. The next generation of technologies must not disrupt 9-1-1 or other emergency communications.

(Griffin and Feld, 2013)

Public Knowledge notes, "This isn't an engineering problem – it's a policy choice." These are basic principles from the era of the telephone which need to be carried forward as we enter the era of the broadband network. Whether Public Knowledge's five principles are comprehensive or correct will no doubt generate debate, as will the ways of implementing them. But the basic idea is to let the broadband ecosystem evolve without undue burdensome legacy regulations.

Similarly, with respect to the general rights of broadband users, the FCC has promulgated the "Four Freedoms":

- Consumers are entitled to access the lawful Internet content of their choice.
- Consumers are entitled to run applications and use services of their choice, subject to the needs of law enforcement.
- Consumers are entitled to connect their choice of legal devices that do not harm the network.
- Consumers are entitled to competition among network providers, application and service providers, and content providers

(Powell, 2004)

These principles are said to be subject to "reasonable network management." These principles, and the FCC's ability to enforce them, are currently contested.

Former FCC Chairman William Kennard envisioned a "new" FCC with the following core functions: "universal service, consumer protection and information; enforcement and promotion of competitive markets domestically and worldwide; and spectrum management." (Ehrlich, 2013)

In March, 2013 FCC Commissioner Ajit Pai suggested a set of rules which include:

1. Consumer protections must remain in place
2. Repeal/scour obsolete rules at federal and state level
3. Combat discrete market failures
4. Allow VoIP providers to directly access telephone numbers

(Eggerton, 2013)

Sean Lev, FCC General Counsel, has noted on the FCC blog that during the evolution over the next 5-8-10 years, the FCC will need to advance the core values of the Communications Act: consumer protection, universal service, competition and public safety. (Lev, 2013)

Taking a somewhat different approach, in May 2013, Craig Silliman, Verizon VP for Public Policy agreed that there needs to be a new policy framework for the "broadband ecosystem". Old approaches, such as "the public interest, convenience and necessity," based on 19th century railroad regulation, were outmoded, he said, and the FCC's regulatory model is too slow to keep up with technological advances. Consumers, he said, can best be protected by a flexible, technology-agnostic regime of multi-stakeholder governance combining the Better Business Bureau and the Federal Trade Commission. (Silliman, 2013). While this model is addressed to the emergence of the broadband ecosystem, it takes a minimalist approach which ignores well-established policy priorities and takes the entire sector out of regulatory purview.

These various and diverse principles-based approaches indicate a useful direction for managing the transition, and all implicitly acknowledge the fact that many, if not most, legacy regulations are no longer appropriate. However, for the post-transition period, a more consistent and comprehensive policy perspective is required, which we suggest below as the "broadband policy space" model. But first it is necessary to look at the actual structure of the analogy embodied in the expression "the broadband ecosystem".

5.0 THE LATTICED STRUCTURAL MODEL

5.1 The "Broadband Ecosystem" Analogy

An "ecosystem" is a word typically used to describe the interaction of a community of living organisms with their environment (e.g., the complex of living things in a pond)[4]. It has been adopted as an analogy to describe the complex of entities functioning as part of the total broadband environment. An early example of its use in this way was in a speech by Verizon's Executive Vice President Tom Tauke in March 2010, in which he is reported to have said:

> *By the very nature of the Internet Ecosystem, many are working together or competing in other company's turf. Computer companies sell phones, and quite successfully. Search engines sell open operating systems. Network providers create their own apps stores. That means that the value proposition to the consumer is really a package created by many companies acting together with little, if any, regard to their previous corporate histories. So no set of companies should be immune from scrutiny.* (Thierer, 2010)

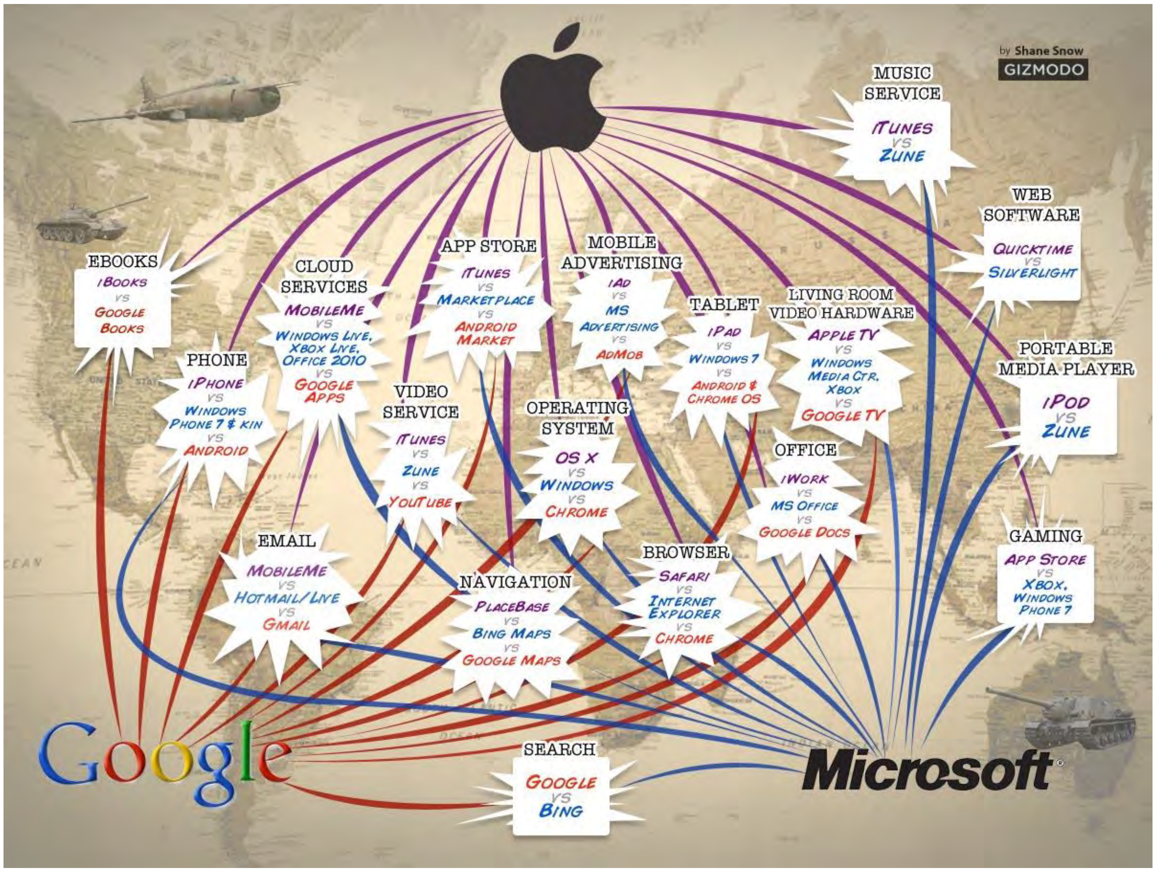
His point was that these companies are so interconnected that they are equally engaged and competitive in a new market, the "Internet Ecosystem" market, and thus all should be treated alike, which in his view meant deregulated. However, if this analogy is to be adopted, it needs to be examined a bit more closely to see what the appropriate policy response might be.

5.2 Modeling the Broadband Ecosystem

[4] Think for example of the pond: insects in the air above; pond scum; predators, prey and bottom feeders in the water; muck in the bottom of the pond with leeches, aquatic insects, crayfish, etc. The whole concept is rich with potential analogies to commerce.

The "broadband ecosystem" is relatively easy to capture in a few words, "Everything that touches, uses, competes over and/or affects the broadband network," but it is far more difficult to create a coherent visual representation. The following are two such partial representations:

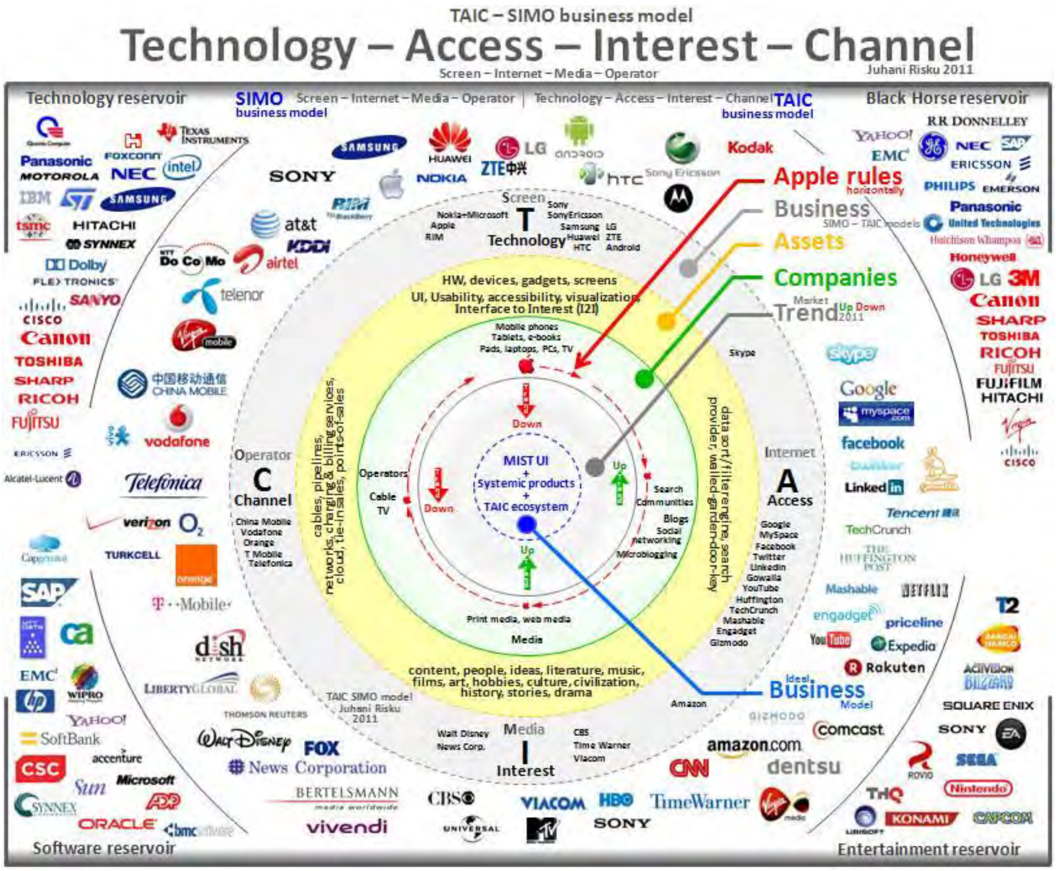
Figure 4. Internet Ecosystem Wars – Apple vs. Google



Krebs, V. (2011) citing Gizmodo.
http://www.thenetworkthinkers.com/2011/05/internet-ecosystem-warsapple-vs-google.html

This chart attempts to show the relationships between just three of the big players. The following one is far more comprehensive, embracing equipment providers, carriers, content producers, content distributors, and providers of applications and services:

Figure 5. Technology – Access – Interest – Channel Business Model



Risku, J. (2012)
http://abstractionshift.wordpress.com/2012/02/19/mobile-internet-ecosystems-apple-google-microsoft/

So, as can be seen from the foregoing, it has been difficult to find a coherent representation of the "broadband ecosystem," as it appears to confound traditional industry categories. However, we believe it can be reorganized in a way that both represents them and shows their interrelationships.

5.3 The Lattice Structural Model (LSM)

The challenge of capturing the broadband ecosystem is easy to see. It is extremely complex, and works across and between various markets, each with dominant players, which both compete and cooperate across traditional boundaries. These include everything from equipment and physical infrastructure to content creators and delivery networks, on-line services and applications. Within this complex of value chains, there are many new opportunities for innovation and growth, as well as many potential new leverage points where competitors may be able to leverage advantage in one area into an adjacent area. To better envision this, we offer the "Latticed Structural Model" of the broadband ecosystem.

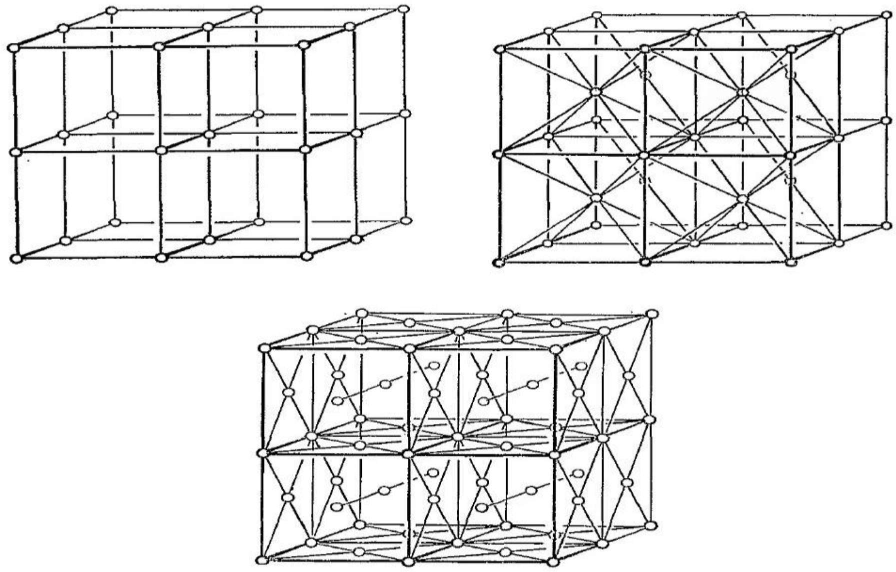
The lattice is a common – indeed basic – form in nature. It is the foundation of crystalline structures, and commonly appears in physics, chemistry, architecture and structural analysis. It even shows up on mom's apple pie (a latticed pie crust). Here is an easy to remember introductory example

Figure 6. Lattice-Top Apple Pie

Haedrich, K. (2013)
http://www.bonappetit.com/recipe/old-fashioned-lattice-top-apple-pie

Somewhat more seriously, we believe a three dimensional lattice is one useful way to try to approximate a representation of the broadband ecosystem. Our model for the broadband ecosystem is built on the idea of a three-dimensional lattice, as shown in Figure 7, below:

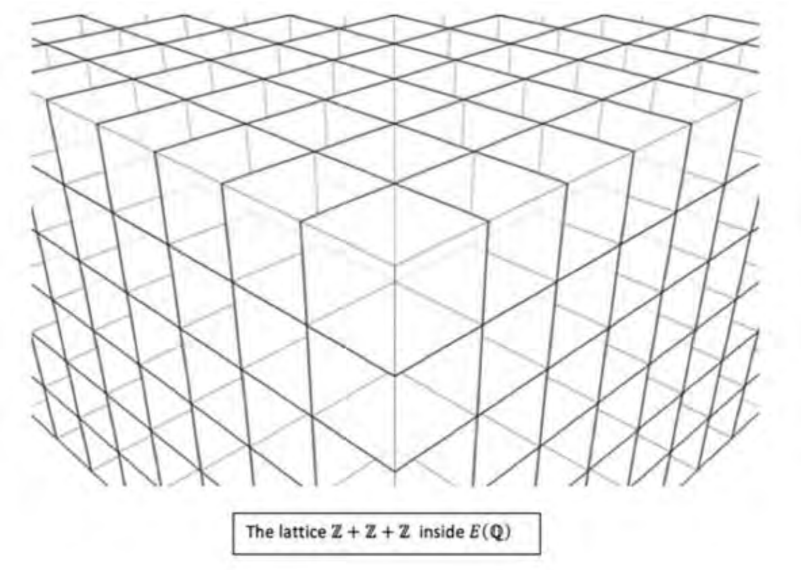
Figure 7. Simple Three-Dimensional Lattices



Ewald, P.,ed. (1999) at http://www.iucr.org/publ/50yearsofxraydiffraction/full-text/crystallography

Three dimensional lattices are often shown as images using molecular structures. Here, for the purpose of simplicity and clarity, these figures show simple lattice structures. Each level of the lattice is called a "plane". It is possible to represent relationships across each plane (horizontal), and between and among planes (vertical). In physics, physicists can calculate the force of each molecule on each adjacent molecule. This basic calculus describing how molecules (or companies in our model) interact with each other both on the same plane and across multiple different planes suggests an opportunity to model anti-competitiveness in the context of the broadband ecosystem. We have only begun to explore this dimension of the model and are at a very preliminary stage, as discussed further below.

Figure 8. A slightly more complicated three-dimensional lattice.



Delbourgo, D. (2011)
http://theconversation.com/millennium-prize-the-birch-and-swinnerton-dyer-conjecture-4242

Consider the slightly more complicated lattice above, which is built up from the simple lattices in Figure 7 stacked several times — illustrated in Figure 8. In the Lattice Structural Model (LSM), each two-dimensional plane of the lattice represents one of the following major sectors of the broadband ecosystem. Note that companies can, and often do, appear in more than one plane of the LSM lattice, for example, Apple and Comcast would each appear on multiple planes, but have a different degree of influence on each. The interesting question is how that influence might be extended across planes.

Now consider a complex, three-dimensional lattice in which the planes represent the primary sectors of the broadband ecosystem, as shown in Figure 9, below.

Figure 9. Broadband Ecosystem Lattice Model

The five planes of this lattice can be further described as follows.

Network Plane: includes ownership and/or operation of physical facilities, equipment, and instructions to make the network operational. Major players would include AT&T, VZ, Time Warner, Comcast and their wireless extensions. Local exchange carriers. Also includes backbone and intermediate carriers (e.g., Level 3); server farms (including "cloud"), e.g., Google, IBM, Amazon; related equipment and middleware, e.g., Cisco; any producers of critical software or relate patent holders (e.g., Microsoft, IBM, Qualcomm); Neustar (numbering). Each of these could be separate "clusters" on the network plane.

Equipment Plane: Companies that make the pieces of gear that comprise the network(s). Includes routers, switches, mobile handsets, connected mobile devices.IBM, Cisco, Ericcson, Huawei, Alcatel-Lucent, Nokia-Siemens, Juniper Networks, ZTE, Apple, Samsung, LG, Sony, Lenovo, Microsoft.

Content Creation Plane: Movie and TV production studies ("Hollywood"); television networks; large independent production companies; record companies, videogame companies; anything of large scale the produces original content. Viacom; cable networks (many owned by companies also in network operations, e.g., Comcast, Time Warner.

Content Distribution Plane: Companies that distribute creative content, e.g., all the cable companies, VZ and AT&T in that capacity, DirecTV and satellite companies; online services like Hulu, Netflix, YouTube. To a growing extent Amazon, Apple, possibly soon Intel, etc.; videogame networks.

<u>Services and Applications Plane</u>: Google (search), Facebook (social), Amazon (shopping); cloud services (by company); voice as a separate managed service (SIP, e.g., Comcast); unmanaged voice (e.g., Skype); Apps stores and individual apps.

Using this model companies can be located and connected both across and between planes. This addresses many of the issues raised by the sectoral/silos model of regulation. It is possible to scale and track market influence both across and between planes, helping to identify areas of potential bottlenecks where more attention might be warranted, keeping in mind that influence can be extended both across a single plane horizontally, or across multiple panes vertically.

On most planes, there will be only 3-7 dominant companies. The idea is not to represent every possible company, but to help identify areas of potential bottlenecks or market dominance. It is not a precise anti-trust tool, but simply a method of visualizing relationships and suggesting where policy makers might want to take a closer look.

The immediate benefit of this model is that it recognizes what is traditionally ignored by other models. Putting that premise into the parlance of the LSM, we would say that traditional models consider only bonds on the same plane but fail to recognize inter-planar bonds.

5.4 Exploring the LSM's Analytic Potentials

While we are at a very preliminary stage of thinking about how to operationalize this mathematically, one avenue of our exploration had included the investigation of the LSM model using the basic mathematics of lattices from physics. As a test case, we explored what operationalization of this model might look like using Comcast and Apple as our sample dataset. There are many possible indicators of market influence, such as market share, or size, or revenues, etc. For purposes of convenience due to the availability of data, and just to investigate how the model might work, we chose to use capital expenditures and various other monetary indicators as a proxy for market power, and to keep the model simple, we focused on only two companies, Comcast and Apple. For the elaboration of the example, see Appendix 1. We believe this is worth continuing to explore, while noting that there may be parallel approaches which may well produce more useful results. We encourage others to explore and further develop these approaches.

6.0 THE BROADBAND POLICY SPACE MODEL

6.1 Scope of the "Broadband Policy Space" Model

Some argue that the broadband ecosystem is so large, so diverse, and so competitive that no oversight is required. Does that mean that there is no role for policy with respect to the broadband ecosystem? Do they assume that there will be no bottlenecks, no areas of market dominance, no leverage of power across planes, no consumer abuses, no public interest and service concerns? Should there be no policy for the broadband ecosystem? That is patently non-sensical, so the question then is what is the proper role of policy in this space? For a unitary conception of the broadband ecosystem, to assure and promote competition and carry forward the normative goals of Congress, there needs to be a comparably unitary conception of policy. We call this the "Broadband Policy Space" model.

The "broadband policy space" is co-extensive with the broadband ecosystem. They are two sides of a coin. It is an overarching concept with both goals and tools which encompasses anything that touches, uses or affects the broadband network or its users or content, including its physical components, software, applications or content. Its jurisdiction is grounded, as part of the (proposed to be amended) Communications Act, in the interstate commerce power (see Sec. 6.3, below). Its authority is limited only by Constitutional constraints, e.g., the First Amendment, and the scope set by Congress.

To address the broadband policy space, Congress needs to take a more expansive view than it has in the past. It is, in effect, dealing with all media and communications rolled into one. Viewing the broadband ecosystem as a whole, Congress needs to clarify and establish the normative policies it wants enabled, remove old and inappropriate legacy policies and regulations to promote growth, innovation and competition, and set out a framework for broad future policy oversight.

6.2 What is the "Broadband Policy Space"?

To do this, we suggest a concept called the "Broadband Policy Space." Within the broadband policy space there are areas both of primary and shared oversight of the broadband ecosystem. It is specifically referred to as the "broadband" policy space and not the "internet" policy space, as there may well be resources/uses/applications of the broadband network which might not be properly described as "the Internet" or "the worldwide web", or even be "IP" based. It includes managed networks, private networks, and the "dark net" as well. The FCC would maintain its overall unique "public interest" mandate. This is a critical factor, as neither courts (which adjudge only cases brought before them), or other agencies (FTC, Justice Dept.) which have a more precise mandate, can address the broader "public interest".

If one thinks of the broadband ecosystem as a single, integrated (albeit highly complex) market, where companies of all sorts compete against each other in numerous ways, at multiple levels (which is what Verizon and others would have us believe) then there needs to be an expansive policy approach which recognizes and respects this complexity. It must be broad enough to embrace whatever affects the network; yet flexible enough to promote competition, protect consumers, and advance society's values.

How can we envision such a policy space which acknowledges normative values and at the same time addresses a diverse new universe of competition and connections which have complex and perverse potentials for bottlenecks and anti-competitive behavior? And how does this differ from traditional regulation?

The "broadband policy space" concept recognizes that policy oversight authority will not be held within a single formal body, but may be dispersed between any number of entities, both private and public, within the space. In this way, it minimizes the problem of setting up public and private interests in opposition. The "policy space" metaphor allows for a more complex mix of policy and regulatory activity which may be uniquely relevant to the emerging broadband ecosystem. It can accommodate a variety of policy and regulatory tools from the market to self-regulation, and enables different jurisdictional responses to similar policy objectives. (Hitchens, 2010)

The broadband policy space concept transforms the idea of the market or the discipline of the market as being separate from policy. It sees the market as another policy instrument within the space, to be relied on as appropriate. The goal of policy would be to assure and promote competition in the broadband ecosystem. Its guiding rule would be forbearance and non-interference unless necessary. Its primary tool should be transparency in the market, especially with respect to consumers.

6.2 Tools of the Broadband Policy Space

The broadband policy space models calls for maximum scope of jurisdiction combined with minimum levels of intervention in cases of threats to competition or to advance Congress' normative policy goals. The "policy basket" of tools includes, but is not limited to, the following. The instructions to the agencies charged with carrying out Congressional intent should be to <u>choose the least intrusive tool that can reasonably be expected to accomplish the stated goal(s)</u>:

- Proactive promotion of competition
- Elimination of inappropriate legacy regulation
- Forbearance
- Consumer protection
- Transparency and publicity
- Mediation/"Good offices"
- Consumer/citizen education
- Self-regulation
- Co-regulation
- Private (contractual) regulation
- Industry codes of conduct
- Industry self-ratings systems and filters
- Anticipatory ex ante market directives
- Ex post pro-competition market actions
- The public interest (e.g., universal service, educational support)
- Federal pre-emption of state regulation (with few exceptions, e.g., consumer protection, police powers)
- Sunset of regulatory legislation

The federal broadband policy space can be envisioned as a combination of agencies, under the direction of Congress, e.g., the FCC, the FTC and the Justice Department (combined with areas of self-regulation and co-regulation, deregulation, and the promotion of competition). It is built around the latticed model of the market, and must be broad enough to embrace any future developments. There is already shared regulatory space between the FCC, the FTC and the

Justice Department. The scope of each agency's jurisdiction should be expanded as needed to embrace the entire broadband ecosystem consistent with their respective legislative mandates. Remedies can be tailored as appropriate for particular problems in particular parts of the space.

6.3 Title VIII of the Communications Act and the New FCC

We put forward the following modest proposal. There should be a new Title added to the Communications Act, Title VIII, entitled "Broadband Networks". Its provisions would be phased in over time as the transition occurs from the current arrangements to a ubiquitous broadband network. The intention is that it will, over time, supersede and replace Titles II, III and VI (with a few carry-forward public interest provisions). During the transition, implementation of most legacy regulations should be forborne, but with the full panoply of policy/regulatory tools held in reserve in the event of unforeseen complications or problems.

This would mean gradual elimination over time, as competition flourishes, of the following legacy regulations and obligations (this list is intended to be exemplary, not comprehensive):

Telecommunications: Interconnection, carrier of last resort, all regulation of rates and terms of service; pre-emption of virtually all state regulation of broadband networks (exceptions for consumer protection, rights-of-way and similar traditional local regulation)

Broadcasting: Television licensing; all ownership and cross-ownership limitations; all content-related regulations (political speech, indecency) except those with an independent jurisdictional basis (advertising, child protection); localism

Cable Television: Municipal cable television franchising and regulation on expiration of current franchises; state regulation only on same basis as other broadband carriers; local only for rights of way, construction

The overall goal of the reorganized FCC will be to promote the efficient operation of the broadband ecosystem and to protect the public interest. That includes assuring broadband ecosystem competition; spectrum management; implementation of public interest policies (e.g., universal service; promotion of pluralism; privacy; security and reliability); and consumer protection. In due course, new subdivisions of the FCC will emerge along these lines, e.g., a "Broadband Consumer Protection Division," a "Broadband M&A Review Board," and "Office of Broadband Public Safety," a "Broadband Universal Service Department," etc.

The FCC tool kit will include transparency and consumer/citizen education. It should be proactive, collecting data, holding hearings, requiring industry reporting; publishing industry and competitive data (and requiring any companies claiming "trade secret" protection to make a showing of actual harm before data can be kept confidential). It can issue NOI's and NPRM's as it does at present, but in the transition, it should mainly focus on collecting data and analyzing it but being restrained and cautious about any intervention in markets. It can intervene as necessary in situations where it believes competition is being unlawfully impaired.

7.0 CONCLUSION

U.S. policy makers need a new way to think about the broadband ecosystem, combining both normative principles and the advancement of competition. First, they need a principles-based, normatively grounded set of policies that review and refresh the historic values of communications policy as set in an entirely new context. Second, there needs to be a new understanding of the "market", embracing the entire broadband ecosystem, based on maximizing competition. To this end, competition should be encouraged, unnecessary legacy regulations should be dropped, relaxed or forborne over a period of transition, with regulatory powers reserved for that period.

Beyond that, for the post-transition period, this paper suggests a new model for envisioning the broadband ecosystem which is intended to more accurately reflect the market realities and to overcome some of the inherent shortcomings in regulatory models based in sectoral silos or in "layered" models based on the framework of a protocol stack. It then proposes the adoption of a "Broadband Regulatory Space" model, which matches the broadband ecosystem in terms of its scope. It takes a very broad view of regulatory "tools" which can be adapted to different circumstances, all with a view to well-functioning markets, consumer protection and the "public interest".

APPENDIX 1

Network Operations Plane

Verizon's Form 10-K for the fiscal year ending 2011 reveals capital expenditures (CapEx) of \$16.46 billion. Verizon's presence on the Network Operations Plane is therefore represented by a 10 × 10 two-dimensional lattice of units on a planar grid where each unit represents CapEx of \$164.6 million. We elected to use Verizon to set the standard cost per unit as it enjoyed the most CapEx for the 2011 year by far.

Examining Apple's SEC filing from the same year reveals its CapEx were \$4.6 billion. Of that total, approximately \$614 million was expended for retail store facilities while payments for acquisition of property, plane, and equipment reached \$4.3 billion. Using our pre-defined cost-per-unit, the model represents this CapEx in Figure 4 by coloring 28 units (spheres) (7 × 4).

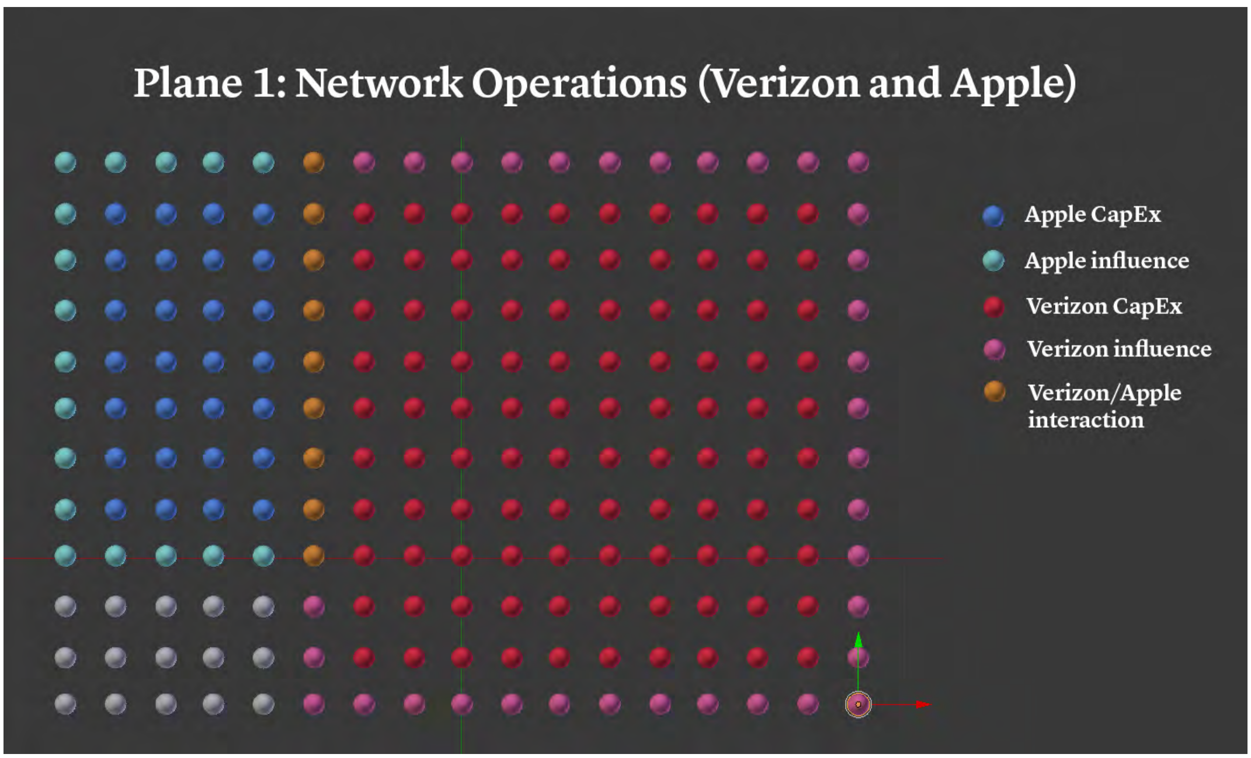


Figure 1. Representation of the Network Operations Plane using 2011 CapEx data from Verizon and Apple as models.

When a company has enough CapEx to claim a unit, we change the color of that unit to match the color of the company (red for Verizon and blue for Apple). The process is repeated until the spheres are representative of the CapEx of all companies given the pre-determined CapEx-per-sphere value (\$164.6 million in this example). With a quick glance, the superior market power of Verizon compared to Apple on the Network Operations plane is apparent.

Were we to stop here we would merely have a neat visual representation of CapEx for these companies. Recall, however, that in lattice theory each unit exerts force on neighboring units. We represent this interaction by indicating units within a company's influence with a lighter shade of the base color (pink for Verizon and teal for Apple). Finally, in units that feel influence from *both* Apple *and* Verizon, we indicate that tension by coloring the unit orange.

Upon completing the plane some noteworthy observations become apparent. First, note that the plane in Figure 4 has 204 spheres representing approximately $33.6 billion possible CapEx in the Network Operations sector. As Verizon claims $16.46 billion and Apple claims $4.3 billion, a straight-forward calculation would suggest that $12.84 billion remains available in the sector. It turns out, however, that when we account for units over which these companies have effectively laid a claim by virtue of their connections to adjacent spheres, a mere $2.5 billion remains wide open for claiming by other companies in the sector.

We should note that we do not anticipate that one company's influence over an adjacent unit entirely precludes competition from claiming that sphere — we merely anticipate that claiming that sphere becomes increasingly difficult for subsequent companies seeking to expand into the sector.

Consider also that for illustrative purposes Figure 4 does not depict the influence of units in the Equipment Production plane. When the units from the lower plane are colorized, it is entirely possible that Figure 4 could have no uncontested space within the sector.

Equipment Production Plane

Although it is more or less ubiquitous within the Network Operations plane, Verizon has never made a dent in the Equipment Production plane. Rather, it is entirely reliant on companies like Apple to create its products. This domination by Apple of the Equipment Production plane was felt by Verizon when, for example, Apple flexed its muscles and cut into Verizon's text messaging revenues through introduction of the iMessage app.

In the fiscal year 2011, Apple reported $9.9 billion net sales from desktops, portables, iPods, iPhones and related products and services, iPads and related products and services, and peripherals and other hardware. Keeping $164.6 million as our cost-per-unit, Apple's contribution to the Equipment Production sector can be represented by coloring 60 units as is seen in Figure 5.

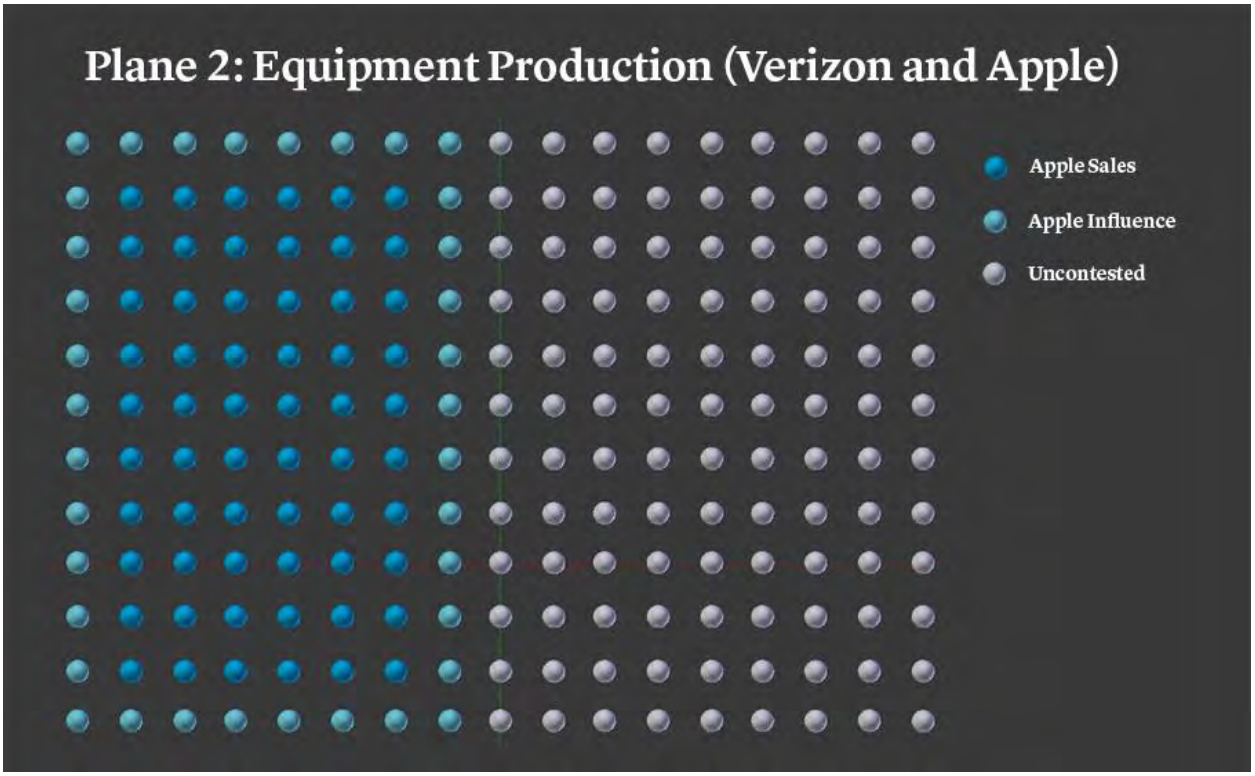


Figure 2. Representation of the Equipment Production plane using sales data.

Content Creation Plane

We would likewise operationalize the Content Creation plane by calculating the amount of money either spent or received from revenues related to content creation. However, neither Apple nor Verizon has devoted any sizable chunk of capital to content creation such that it would be realized by claiming a sphere. Accordingly, Figure 6 depicts the Content Creation sector in our closed universe.

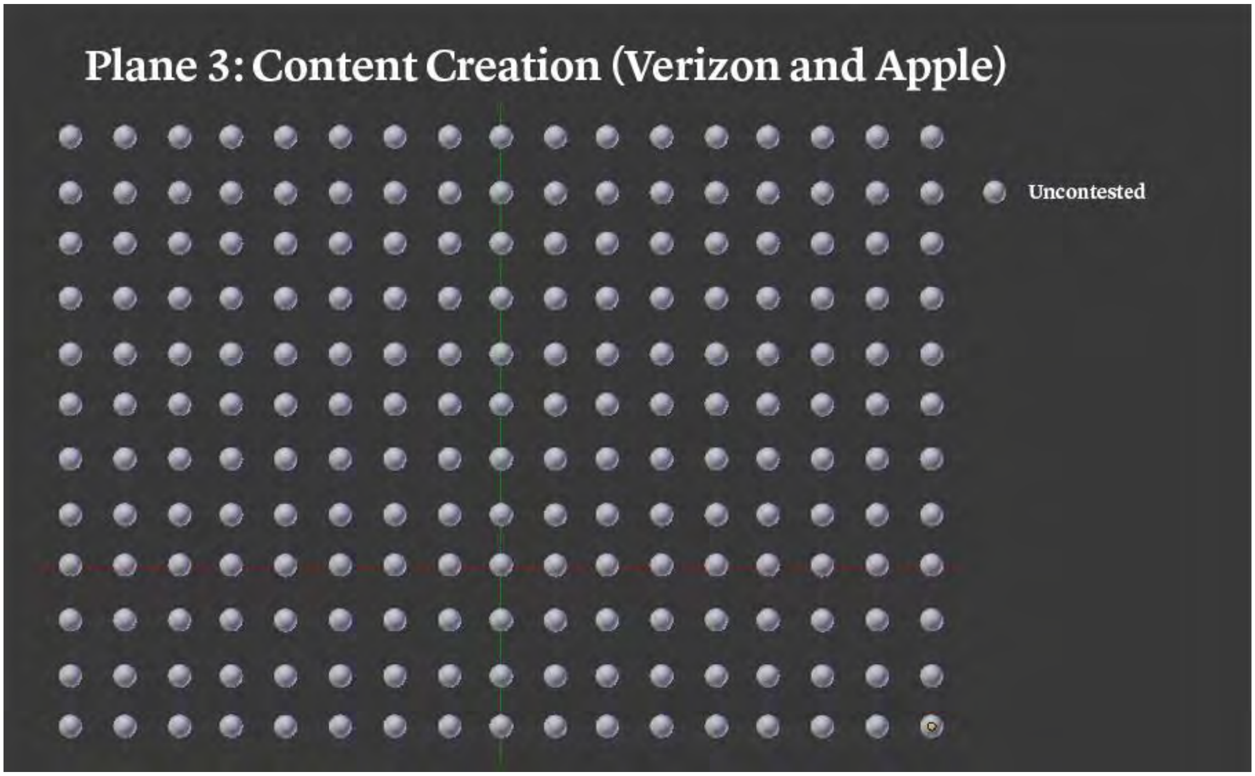


Figure 3. An empty content creation layer.

Content Distribution Plane

Both Apple and Verizon are key players on the content distribution plane with Verizon distributing the majority of creative content via wireline FiOS and Apple distributing its content through the iTunes Store, App Store, and iBookstore. In 2011, Verizon enjoyed approximately $17.7 billion (107 spheres) in revenues from wireline content distribution services. Apple reported revenues of $5.4 billion (32 spheres) from its three major content distribution networks. Figure 7 illustrates the Apple/Verizon plane using these numbers.

At the time of the deadline for the submission of this paper, this is as far as this analysis had been conducted.

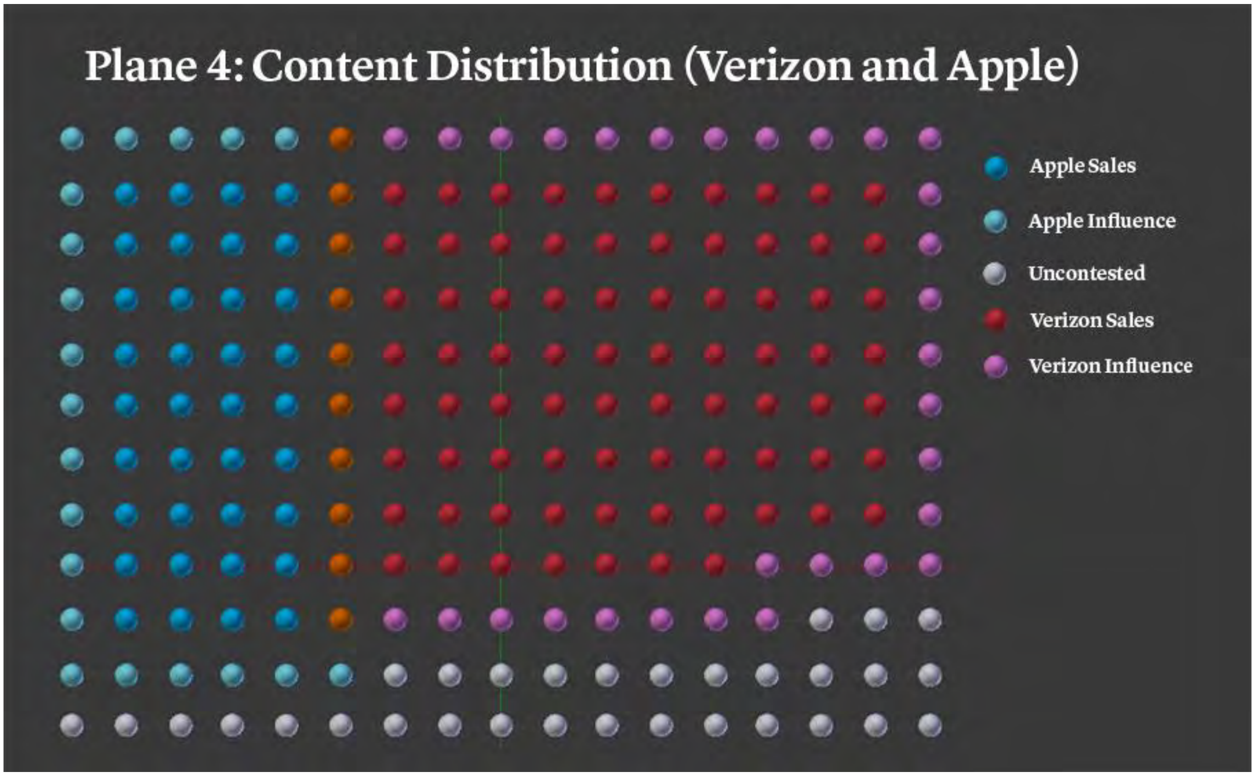


Figure 4. Content Distribution plane.

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ej__071v&sig=tdbnxcW3rZznNnEOVri7yIzF_rg&hl=en&sa=X&ei=HkvoUaKIOLWp4AO3lIDICQ&ved=0CGEQ6AEwCQ#v=onepage&q=normative%20information%20society&f=false

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Subject: Communications Act Update
Date: Thursday, January 23, 2014 at 9:29:15 AM Eastern Standard Time
From: Rick Amweg
To: CommActUpdate

I wish to comment on the move to update the Communications Act. I will comment on some of the questions outlined in the whitepaper as indicated below. But my focus is mainly on public safety communications and emerging technologies in that area. Please see my comments below.

Questions for Stakeholder Comment

1. The current Communications Act is structured around particular services. Does this structure work for the modern communications sector? If not, around what structures or principles should the titles of the Communications Act revolve?

    Although there have been some criticisms of this "siloed" approach to regulation it remains a viable approach to the field, given the various technologies are what affect Americans most directly. For example, cable television, as an industry deserves specific regulation because it affects the American consumer in different ways than other sectors, such as wireline or wireless telephone services. The focus of the changes need to be on making regulation more consistent across the sectors rather than breaking down the sectors. Additionally, the new regulations, and the way the Commission responds to the sectors needs to be more consistent, which in turn will address issues as technologies address services in more than one sector (e.g.: VOIP as a telecommunications service vs. VOIP as a data service).

2. What should a modern Communications Act look like? Which provisions should be retained from the existing Act, which provisions need to be adapted for today's communications environment, and which should be eliminated?

    I believe the titles of the Act should remain in place. Efforts at modernization should be focused on eliminating, or making more permeable, the separation between the divisions within the FCC. Clearly the FCC needs to be less focused on single-sector regulation and have a regulatory scheme (as described in the whitepaper) that is able to focus on very specific matters that are unique to the sector but also transcends the sector specific barriers where technology overlaps.

3. Are the structure and jurisdiction of the FCC in need of change? How should they be tailored to address systemic change in communications?

    Most of the structure of the FCC should remain in place, with the exception of the regulatory functions of the Commission. As mentioned above, there is a need to address regulatory issues in an way that transitions the various sectors. In addition, changes to the Act should erase ambiguity in the regulatory authority of the Commission.

4. As noted, the rapidly evolving nature of technology can make it difficult to legislate and regulate communications services. How do we create a set of laws flexible enough to have staying power? How can the laws be more technology-neutral?

    For the most part, laws creating the regulations should focus on the end result; that is, what is the end result to the consumer (and in some cases non-consumers affected by the technology). Clearly the exception to this would be if someone created a new technology or process relating to communications that has never before been part of this country's communications infrastructure (likely not to happen). By focusing on the service provided and regulating that service two things occur: the consumer is protected and the underlying technology, no matter what it is, is indirectly regulated as well.

5. Does the distinction between information and telecommunications services continue to serve a purpose? If not, how should the two be rationalized?

I think there is still a distinction and, to the extent the two are regulated differently, there is a purpose in keeping them separate. I do not believe that information services should remain unregulated, particularly when so many "information" service providers are shielded from regulation when behind the information service they are providing are telephone and television services. It makes sense to rationalize them from the context of regulation, but not, perhaps, from the perspective of technology (see earlier comment).

Additional Comments

As I mentioned above, my primary focus in the communications field is public safety communications. I believe there needs to be consolidation of public safety concerns related to communications. Public Safety Communications is rapidly evolving into an interrelated 3-sector service model for first responders and citizens. I frequently refer to this model as the "3 leg stool" because to support the public safety communications platform represented by the seat, all three legs must be there. The three "legs" or sectors to which I'm referring are: 1) telecommunications (wireline and wireless), most frequently represented by the 9-1-1 industry; 2) radio (voice) communications, commonly represented by the P-25 interoperability standards being developed across the country; and 3) data communications, represented at the national level by FirstNet and the Nationwide Public Safety Broadband Network (NPSBN) (the "new kid" on the block). All three of these are emerging technologies for public safety. As public safety professionals across the nation struggle to refine and define these services by examining interoperable communications challenges, next generation 9-1-1 protocols, and a truly seamless, ubiquitous wireless data network dedicated to public safety, those officials are faced with a spectrum of regulation, ranging from nearly no regulation at all to very complex regulations and by different agencies.

I am proposing that the modernization of the Communications Act should add a new title and bring all regulation and support for public safety communications (defined as beginning the moment a citizen dials 9-1-1 to the time a the scene is stabilized by first responder actions) into a single element that both supports and regulates what truly is a utility-like natural monopoly.

Respectfully submitted,

Rick Amweg
Representative to the Ohio Statewide Interoperability Executive Committee
[redacted]

January 31, 2014

Mr. David Redl
Chief Counsel – Communications and Technology
US House Committee on Energy and Commerce
2125 Rayburn HOB
Washington, DC 20515

Dear Mr. Redl:

On December 3, 2013, Chairman Upton and Chairman Walden announced their panels would embark on a year-long initiative to review and ultimately update federal telecommunications policy. On January 8, 2014, the two chairs released the first White Paper tied to this initiative that included five questions to stakeholders designed to help the House panels with their review and deliberations. First, we express our appreciation to Chairman Upton and Chairman Walden for initiating this important review of our federal telecommunications law. The legislative action related to this effort will impact every customer in each of the states.

On behalf of the Alaska Rural Coalition and Idaho Telecom Alliance (Rural State Association Group – RSAG), GVNW[1] submits the attached comments in response to the initial five questions from the Committee on Modernizing the Communication Act.

Alaska Rural Coalition. The companies of the ARC that are participating in this filing[2] serve customers in some of the most extreme regions of the United States. Alaska is a uniquely high cost area within which to provide any telecommunications, whether traditional telephony, mobile or broadband. Much of remote Alaska lacks even the basic infrastructure critical to most telecommunications deployment, such as a road system and an intertied power grid.

Idaho Telecom Alliance. The companies in the Idaho Telecom Alliance work collectively to support the advancement of their members and promote services to rural telecommunications subscribers throughout the rugged terrain of Idaho.

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[1] GVNW is a management consulting firm that provides regulatory and legislative advocacy support for communications carriers in rural America.

[2] The ARC members in this filing include Arctic Slope Telephone Association Cooperative, Inc.; Bettles Telephone, Inc.; Bristol Bay Telephone Cooperative, Inc.; Bush-Tell, Inc.; Copper Valley Telephone Cooperative, Inc.; OTZ Telephone Cooperative, Inc.; Alaska Telephone Company; and North Country Telephone, Inc.

The challenge facing the Committee as it seeks to rewrite federal telecommunications law is to enable broadband to truly be embedded in the national infrastructure while creating a framework of rates so that service and cost are reasonably comparable. This will require universal service provisions to continue to be an important part of any rewrite effort.

Please call me on [redacted] or contact me at [redacted] if you have any questions.

Regards,

s/JHS 1/30/14

Jeffry H. Smith
President and CEO

Copy to
Chairman Fred Upton, House Energy and Commerce Committee
Ranking Member Henry Waxman
Chairman Greg Walden, Communications and Technology Subcommittee
Ranking Member Anna G. Eshoo

Mr. Ray Baum

RESPONSE OF THE RURAL STATE ASSOCIATION GROUP (RSAG) TO HOUSE ENERGY AND COMMERCE COMMITTEE

Modernizing the Communications Act
FIVE QUESTIONS FOR STAKEHOLDER COMMENT

1. The current Communications Act is structured around particular services. Does this structure work for the modern communications sector? If not, around what structures or principles should the titles of the Communications Act revolve?

For many decades, review and oversight of specific service provision has been the chosen means for regulators to protect the public interest. When a carrier offers a service for a fee to the public, this event triggers a considerable amount of regulatory oversight and compliance reporting.

Regulation of services, with a focus on the most common customer interfaces (e.g., residential single party access line), has been the method used to regulate entire classes of carriers in a consistent but at times inequitable manner. The current term of art is that federal telecommunications regulation consists of "silos." Silos, or distinctions based on the specific network technologies used and services provided, have been created by using different titles of the Act to oversee separate classes of carriers. While logical at the time of each silos implementation, inconsistency has arisen as the convergence of technology has occurred in our modern digital era. Intermodal competition and the journey to an all IP platform create a pressing need to reexamine such an arrangement. With functionally equivalent services being treated differently based on which Title applies to their provider, the timing of this legislative review is on target.

If a public policy decision is made to transition away from or modify to some degree this current silo-based regulation, there are a variety of options. We offer two for the Committee's consideration in their deliberation**: silo reduction and silo reshaping**.

First, we share the foundational public policy principles[1] of the Rural State Association Group that guide our responses in this filing:

1 – Affordable broadband should be available to all Americans

2 – Federal universal service support should be sufficient and predictable

3 – Policies should promote competition while protecting consumers

4 – Public safety and national security should continue to be a priority

A first option that we identify as "**silo reduction**" would establish stratification by two sizes of carrier, using either revenue levels or number of customers. Such a distinction could facilitate different time frames for certain future actions being applied to each of the two groups of carriers. For example, in his prepared testimony for the January 15, 2014 House communications subcommittee hearing, former Federal Communications Commission Chairman Dick Wiley recommended that: "*New regulations should be instituted with a lighter touch, accompanied by sunset provisions so that the rationale for continued government intervention can be reviewed on a regular basis*." It is easy to see that the timing of certain sunset provisions could differ for large carriers when compared to small carriers on issues such as market power, transport issues and reporting requirements.

A second option, known as "**silo reshaping,**" is to develop one set of regulation that applies to all carriers under regulation. The transition to this approach could be initially difficult, and a challenge over the long-term as well due to the vast array of circumstances that would be placed into a single class of carrier. This could perhaps be

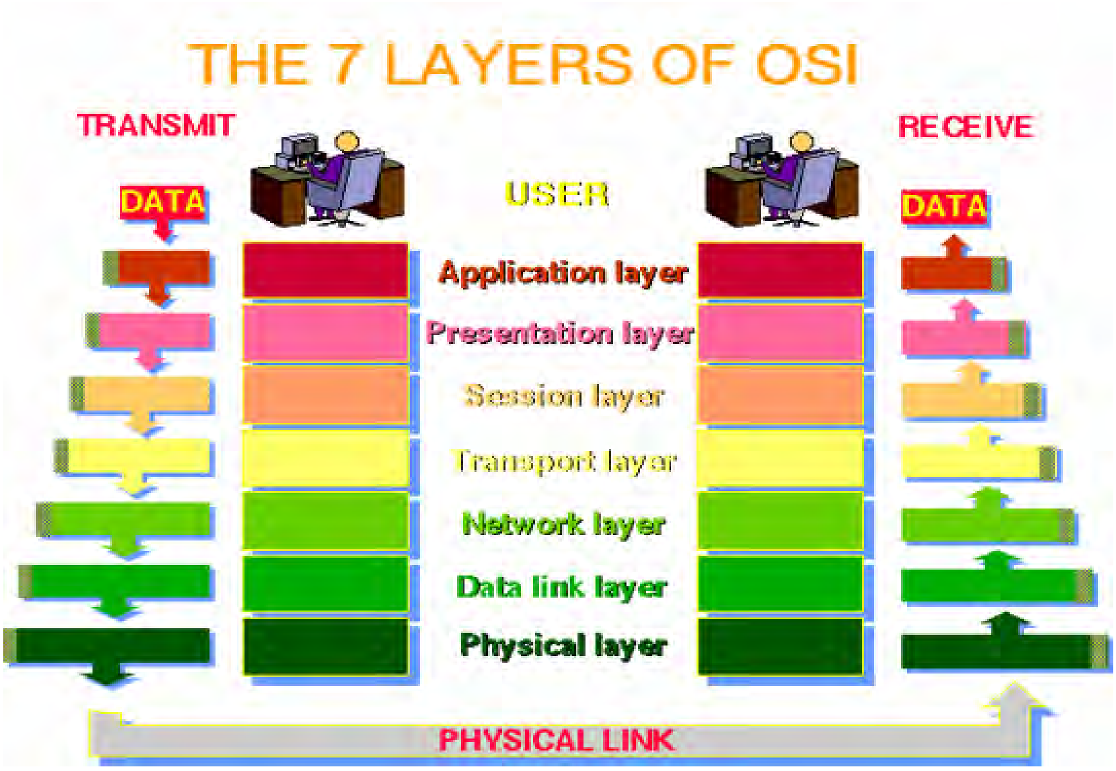
[1] We note with interest the consistency between the RSAG principles and the five essential principles postulated by Public Knowledge in their FCC ex parte filed on February 18, 2013 in GN Docket No. 12-353: service to all Americans, interconnection and competition, consumer protection, network reliability, and public safety.

mitigated by shifting the service focus to one of examining the OSI network layers involved. This could be viewed as reshaping the “vertical silos” to “horizontal layers” of distinction.

A quick review of what we mean by OSI (Open Systems Interconnection) network layers is in order here. A modern data communications system is made up of a vast number of pieces that must all work together to accomplish the task of allowing an application, such as Email, to communicate and pass data to another application. These applications can effectively communicate between themselves from any place on Earth and can evolve a multitude of devices because of standards such as the OSI Model. Some of these related pieces are more closely related than others in their function, so if we can take and group these pieces, by function, into a logical group we can gain greater efficiencies.

We can take advantage of changing technologies, specialized skill sets of engineers and software developers, changing global standards, and new and innovative applications. The designers of the OSI Model for data communications instituted a standard that defined 7 logical groupings or layers, each one defined to perform a group of related functions. Each layer was required, in addition to these functions, to only interface with the layer above and below, and no relationship with other layers is allowed. The interface between the layers was designed to be both extensible and well defined, which would enable any layer to be modified or even replaced without affecting any of the other layers. This allows the OSI model to be future proof, to change over time to take advantage of new technologies, new services, new applications, as well as accommodating needed changes at any layer.

One other important design consideration that the OSI model defines is that each layer will communicate with the same layer on another device. So something like Email would only communicate with the layer below it and to the Email application on another device. All this makes for simplified, efficient, extensible, and globally accepted means of communications.



Layer Functions

Application Layer

To most people this is all that they will ever see of the OSI Model, as it is the point where application, such as Email or Web Browsing function. It also acts as the interface to the network. The Application Layer responsibility is to communicate to a similar application with standard based commands and formatting.

Presentation Layer

This is the point where the device or computer gets into the act, as it will take the data passed to it, format it, encrypt and compress it, if it is required, for presentation to the destination device. It is usually the devices' operating system that performs these functions.

Session Layer

The Session layer acts as the manager to establish and terminate the connection between applications. It may also be called on to manage and create a secure connection between the applications.

Transport Layer

At this point, we are leaving the device and actually using "The Network". At this point is where we start to organize data into packets. This layer is also charged with accounting for lost packet treatment, managing when to send a packet or when to wait to send a packet, and how to detect if a packet has been damaged and how to repair it.

Network Layer

The Network Layer is the layer that is most identified with networking. It controls how packets are routed or forwarded over the many paths that are found in a modern communications system. This layer needs to know about its neighbors and its neighbor's neighbors, in many cases it has to have or be able to acquire knowledge of the network that can span across the globe. It has to be able to calculate the optimal path through the network based on a diverse set of parameters.

Data Layer

The Data Layer defines how the network device will interface with transport medium. It deals with bit grouping, bit transfer rate, detection and correction of lost bits, and circuit down and up conditions.

Physical Layer

The medium, whether it is copper or fiber or even two cans connected by string, will be how the devices will be linked together. At this layer, we have to concern ourselves with things such as voltages, voltage level changes, number of wires, and timing of the bits sent. This layer is not only a logical layer, it is the layer that most likely tracks with actual physical equipment represented by copper or fiber and the device charged with sending signals over the physical medium.

As AT&T explained to the FCC in its IP transition petition, the TDM-to-IP transition is the single most profound telecommunications development of the past twenty years. Communications providers have historically offered discrete telecommunications services such as voice or video over separate single-purpose telephone or cable networks, and now are increasingly offering such services as higher-layer applications running over unified broadband IP platforms as described in the OSI example above. If Congress decides to use this point in the TDM to IP transition to craft a legislative platform that uses as a regulatory focus the horizontal layers that are the backbone of the IP paradigm, some obvious initial questions are discussed in the answer to Question 4.

2. What should a modern Communications Act look like? Which provisions should be retained from the existing Act, which provisions need to be adapted for today's communications environment, and which should be eliminated?

As a preface to this response, let's review briefly how we evolved to the current provisions and titles in place today. The Communications Act of 1934 ("the Act") created the Federal Communications Commission under Title I of the Act. At a time when the assumption of a natural monopoly industry paradigm was valid, Title II addressed common carrier regulation of telephone and telegraph. Title III addressed radio communications, expanding in 1967 to include television broadcasting. The Act also established provisions for administrative and procedural matters, penalties and fines, and miscellaneous matters.

New challenges were tackled with the Telecommunications Act of 1996 ("the 1996 Act"). This comprehensive overhaul of the Act was intended to achieve dual objectives: to move away from the assumption of a natural monopoly and promote competition for local phone service while at the same time codifying the decades old national public policy of universal service, which is still relevant today.

The rules to implement the current provisions of the Act and the 1996 Act are found in Title 47 of the Code of Federal Regulations and currently include seven titles: general provisions, common carriers, provisions related to radio, procedural and administrative provisions, penal provisions and forfeitures, cable communications, and miscellaneous provisions.

An issue that we expect will be addressed in any Act rewrite is how to adapt the current "silo" basis of regulation that focuses on individual sectors of the communications economy into the current arena of intermodal competition. The rewrite will need to address whether to continue to maintain different regulatory obligations based on the mode of technology employed, or whether different regulatory obligations will be as a result of a different metric (e.g., size of company or number of states operating in).

With that very brief summary of eight decades of regulatory oversight, we offer initial thoughts as to the three issues delineated for specific stakeholder input in this second question:

What should be **RETAINED**?

The modernization of the Act should include provisions that require the Federal Communications Commission to regulate carriers if such regulation is necessary to incent wider availability of broadband access, ensure reasonable rates, protect customers, or otherwise promote the public interest. A key section that should be retained is the universal service provisions.

In response to those who will file comments that virtually all regulation should be eliminated and instead rely on market forces, we encourage the Committee to closely examine the debacle that is still occurring in the FCC Rural Call Completion docket (WC Docket No. 13-39, FCC 13-18) as a prime example of why there is a continuing need to be careful in removing regulations. Despite rules being in place, there has been barely perceptible progress in addressing the market failures in rural areas. We respectfully submit that a similar trajectory may well occur as we continue to move toward an IP paradigm. Absent necessary enforcement tools, the call completion problems in current rural areas may be dwarfed by market abuses that will occur in the rural IP arena. As NTCA offered in its IP transition petition filed in November, 2012: "*When the interests of individual consumers and the terms and conditions by which networks are connected hinge largely on the discretion of individual industry participants,*" it is unclear whether the cornerstones of consumer protection, competition, and universal service can be achieved if market failure or service disruption occur.

What current provisions should be **ADAPTED**?

The modernization of the Act should include provisions that require the Federal Communications Commission to adapt certain existing regulations that have become outdated by technological change if such regulatory oversight of carriers is still necessary to incent wider availability of broadband access, ensure reasonable rates, protect customers, or otherwise promote the public interest.

Recent FCC docket activity indicates widespread consumer recognition for the adaptation of current rules. For example, in the GN Docket No. 12-353 proceeding in late 2012 and early 2013, AARP observed that: "*There may be legacy obligations that may not make sense per se in the IP-enabled broadband world because of their PSTN-based specifics. However, the legacy obligations hold the kernel of a policy objective that will continue to make sense for the IP-enabled broadband environment, thus requiring a reworking of the legacy requirement.*"

Universal service provisions belong in this category as well, as the legacy voice mechanisms must be transitioned to reflect the need for support for broadband in certain portions of the United States.

The 1996 Act established rules for interconnection between carriers and wholesale access to incumbent networks. Interconnection obligations continue to be relevant in an IP environment. Technology changes do not erase to need to ensure the ability to connect and receive compensation for such connection. We anticipate that the interconnection obligations will need to evolve in a broadband paradigm. We believe this portion of the regulations must be adapted so that no party or group of providers may ignore sections of law they find to be inconvenient or contrary to their own interests.

What would be prudent to **ELIMINATE**?

On the first page of the Second Edition (1999) of their seminal work, Federal Telecommunications Law, Peter W. Huber and his colleagues (Huber, Kellogg, and Thorne) offer the following with respect to eliminating or maintaining regulatory rules:

A new paradigm of unfettered competition – without entry barriers, quarantines, or tariff regulation – is beginning to emerge. The transition is by no means complete. Indeed, regulation today is at its apogee, ***because a smooth transition to competition requires that new rules be erected before the old can be dismantled. (Emphasis added)***

In its *Petition for a Rulemaking to Promote and Sustain the Ongoing TDM-to-IP Evolution* filed with the FCC on November 19, 2012, the National Telecommunications Cooperative Association placed into the record the important concept of "smart regulation" review. The Committee should consider this type of an approach in its current deliberations. The concept of the smart regulation review is that regulations are not automatically assumed to be unnecessary, but rather evaluated against the core objectives of protecting consumers, promoting competition, and ensuring universal service. As NTCA stated at page 16 of its Petition:

This effort can and should be achieved through a balanced and surgical review of the existing regulatory framework that should be coordinated with state regulators to determine whether specific regulations deter or hinder an IP evolution and the degree to which such regulations might remain necessary or require modification to protect consumers, promote competition, and ensure universal service in an "all-IP world."

We submit that the smart regulation review approach can be adapted to become a smart legislative review approach that should be applied to the analysis of what provisions should be eliminated in this modernization of federal telecommunications law.

3. Are the structure and jurisdiction of the FCC in need of change? How should they be tailored to address systemic change in communications?

Since its transformation from the Federal Radio Commission in 1934, the Federal Communications Commission (FCC) has provided eight decades of dedicated public service, seeking to meet the needs of American citizens as the communications technology has evolved at an increasing rate. A modernization of the Act would signal yet a new challenge as the FCC would face an even more daunting task than it faced with the 1996 Act or its 2011 Transformation Reform Order. The Commission currently enjoys jurisdiction over wireline and wireless communications, television and radio broadcast, satellite operators, and cable television.

In his interview on C-SPANs Communicators series that aired on January 18, 2014, Federal Communications Commissioner Ajit Pai stated that the Communications Act has not kept up with the marketplace, leaving the FCC stuck with regulating based on an out-of-date statutory framework. He further offered that we've reached the point now with intermodal competition that the FCC needs to be able to take action to bring its regulations into the 21st century, to reduce the silos, and that a federal telecommunications legislative update would be very useful.

Today, the Commission is organized in large part in a manner that mirrors the structure of the Act and the 1996 Act, and has continued to impose regulations that derive from its Title II common carrier oversight authority. While the names of the bureaus have changed from the 1970's Common Carrier Bureau to the present Wireline Competition Bureau and Wireless Competition Bureaus, a clear linkage to its common carrier legacy remains embedded in its regulatory DNA. The common carrier concepts predate the Communications Act of 1934, and can be said to have arrived with the Pilgrims. The earliest common carriers "*were created when the Crown awarded an exclusive monopoly to a company operating such things as a ferryboat, a wharf, or, for a time, a printing press. The English common law gradually developed rules that both contained monopolists' excesses and defended their monopolies. Crown monopolies were required to charge only reasonable and nondiscriminatory rates, provide adequate service, and accept all customers on the same terms, without discrimination*." (Federal Telecommunications Law, Second Edition, page 13)

In the present day, this has created some significant challenge for the Commission in areas such as regulation of the Internet and the fact that the Internet has provided some significant "classification" challenge for the FCC, as evidenced by the partial remand to the FCC from the DC Circuit Court of Appeals in the open Internet proceeding on January 14, 2014.

At this point, it is helpful to review the foundational public policy principles of the Rural State Association Group that guide our responses in this filing:

1 – Affordable broadband should be available to all Americans

2 – Federal universal service support should be sufficient and predictable

3 – Policies should promote competition while protecting consumers

4 – Public safety and national security should continue to be a priority

In order to achieve the tenets of the fourth principle, we recommend that the FCC retain the Public Safety & Homeland Security Bureau.

Changes to FCC structure would necessarily follow with decisions made to the platform used to regulate carriers. For example, if the decision is made to shift from regulation of services to regulation by size of entity, then the Bureau designations at the FCC might well change to Large Company Oversight Bureau (LCOB) and Small Company Oversight Bureau (SCOB).

Concomitant with the review of the future structure and jurisdiction of the FCC is at least a healthy debate as to the proper role of the state Public Utility Commission (PUC) in the future. State PUCs possess geographic proximity to the companies they regulate, and in many cases have a rich institutional memory of the challenges that are faced by carriers in meeting the challenge of providing quality and affordable communications services to consumers.

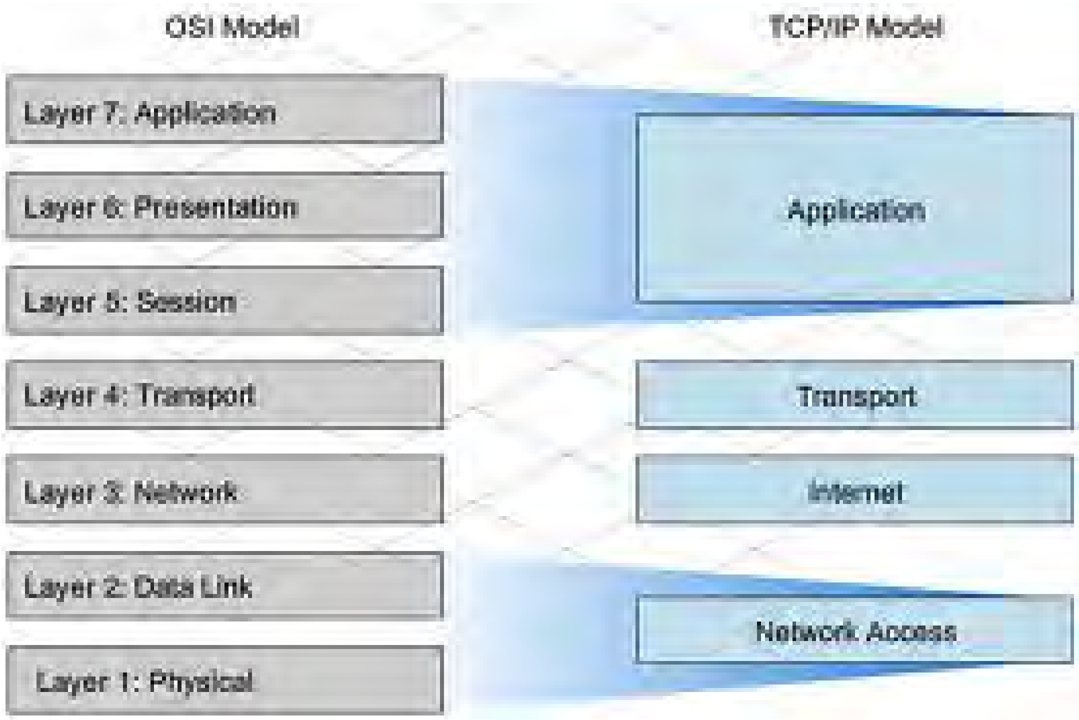
4. As noted, the rapidly evolving nature of technology can make it difficult to legislate and regulate communications services. How do we create a set of laws flexible enough to have staying power? How can the laws be more technology-neutral?

The simple answer on how to create a set of laws flexible enough to have staying power is to develop a platform that is immune from changes in technology and the related service offerings. If this was easy to do, it would have occurred sometime during the last eight decades.

If Congress decides to use this point in the TDM to IP transition to craft a legislative platform that uses as a regulatory focus the horizontal layers of the OSI model that are the backbone of the IP paradigm, one obvious initial question is how will the wholesale vs. retail distinction be addressed?

We show below a side-by-side of the OSI and TCP/IP models and offer a couple questions with answers for the Committee's consideration.

OSI - Open Systems Interconnection
Networking Model the IP way



Questions

Q - Is there a logical point where regulation should be established?
A – At layer 3 Network layer or the Internet layer in the IP model. We expect transport issues will also require regulatory attention in order to protect customers and promote universal service.

Q – Do all Application or services require similar amounts of resources?
A – Somewhat, but some applications will require additional resources like priority delivery, or requiring larger storage buffers/memory.

Q – Is there a way to segregate jurisdictional usage?
A – Again somewhat but only partially, the internet is a mesh type of network not like Telephony which is a hierarchical network. With a mesh network there are many ingress and egress points and packets can follow many different paths. Even to the point that packets within the same session can follow different paths.

In sum, the FCC has found it necessary to use some form of "silos" in order to not have to regulate companies on an individual case basis. The seminal question is: "What do we rename the silos?" One logical and implementable approach would be to gear the regulatory construct to focus regulation by size of carrier, the silo reduction option we describe at page 2 of this document.

The challenge is to create a sustainable platform that is as relevant in a decade as it is today in order to realize any benefits from a modernization effort.

5. Does the distinction between information and telecommunications services continue to serve a purpose? If not, how should the two be rationalized?

The simple answer is no. As Joel Mokyr noted in his 1990 work The Lever of Riches, "*every invention is born into an uncongenial society, has few friends and many enemies.*" For decades, regulation or lack thereof has been used as a tool to foster the development of invention.

The Federal Communications Commission first began to study the convergence of computers and communications in 1966. This regulatory attempt to draw a line of distinction began with the Computer Inquiry dockets at the FCC, as the FCC struggled with the question of where the computer industry ended and the telecommunications industry began.

To summarize a lengthy process in a short paragraph, the result of *Computer I* was to deregulate information services. In *Computer II*, the FCC preempted the state regulation of information services. The *Computer III* segment of the trilogy confirmed the deregulation of information services.

With this origin developed during the Computer Inquiry series of dockets, the distinction between information and telecommunications services has continued to be an attempt at drawing a bright line between services that are regulated and services that are not. In the 1996 Act, provisions were enacted so that "telecommunications" services were subject to Title II common carrier regulation. Separate and distinct was the designation for "information" services that would not be covered by Title II common carrier regulation. The goal for many carriers became to have their service offerings be considered as information services and thus outside the regulatory burden that Title II regulation brings to bear.

Since the purpose has been to identify services to regulate versus services not to regulate, we expect this to continue in some form. The Committee may wish to provide some direction that would shift the focus to the OSI layers that we discussed earlier.

TO: COMMITTEE ON ENERGY AND COMMERCE
U.S. HOUSE OF REPRESENTATIVES
FROM: SMALL COMPANY COALITION
RE: MODERNIZING THE TELECOMMUNICATIONS ACT
JANUARY 31, 2014

The Small Company Coalition (SCC) is an executive-led group of small rural communications carriers and vendors. The SCC's primary focus is to revise the Federal Communications Commission's (FCC) Universal Service Fund (USF)/Intercarrier Compensation (ICC) Transformation Order. The SCC believes that the Order is wholly flawed and has offered a comprehensive rate-of-return model, known as the Alexicon model, as a solution. The FCC released its Order to reform USF and ICC mechanisms in November of 2011, with the ultimate goal of connecting 18 million underserved or unserved consumers to broadband services. The manner in which the FCC proposed to reach this outcome is contradictory to the stated goal as well as the Congressionally-mandated "sufficient and predictable" requirements provided by the 1996 Telecommunications Act.

Included in the reforms is the implementation of Quantile Regression Analysis (QRA), a technique used to determine various expense caps. The QRA creates an atmosphere of complete uncertainty, as the cap changes year-to-year and cannot be known prior to its annual implementation. These same caps retroactively punish companies who made investments under the old rules. Many of the revenue recovery mechanisms which existed when these investments were made have been either reduced or eliminated. Recently, FCC Chairman Tom Wheeler has publicly stated that he intends to replace the QRA methodology. The SCC urges Congress to work with the FCC on these reforms.

The FCC has offered a waiver process as the solution to any possible reform-related red-lining. However, the waiver process is onerous and the prerequisites for receiving a waiver are entirely irrelevant to the FCC's stated goals.

The SCC also seeks to lessen the regulatory obligations for small rural communications carriers. The FCC requires numerous regulatory filings that seem to have no relevance to the implementation of USF, ICC or other operational obligations. While the SCC understands the need for transparency and accountability, these filings are time-consuming and expensive for small rural communications providers.

The SCC appreciates the Committee's willingness to examine and possibly reform issues related to the provision of communications services in rural America. The Committee should examine the negative impacts of the FCC's 2011 reforms and take action to better fulfill the goals of the National Broadband Plan while lifting some of the duplicative, time-consuming and costly regulatory requirements.

Please feel free to contact the SCC for more information: Randy Tyree, GRTyree Consulting, 202-203-8962 or tyree_r@verizon.net.

Subject: (none)
Date: Friday, January 10, 2014 at 12:28:24 PM Eastern Standard Time
From: SEAN SHORE
To: CommActUpdate

My question is, which big businesses have put money in your pockets to craft this rewrite of the law, which will no doubt NOT be in the interest of consumers..

600 MHz Auction Winners Should be Required to Compensate Displaced Wireless Microphone Users

Wireless microphones are essential to all aspects of the entertainment business, news reporting, and U.S. commercial, civic, and religious life. They figure in the production of nearly all TV programs; sports broadcasts from local college teams to the Super Bowl and the World Series; political conventions; post-election coverage; the Oscar, Emmy, and Grammy Awards shows; the Olympics, NASCAR races, the Kentucky Derby, and major golf and tennis tournaments; and local and national on-the-scene news reporting.

Motion-picture production needs wireless microphones for clear, accurate audio. Live events, from Broadway productions to stadium-sized outdoor concerts use them to reach the back row. Presenters in auditoriums, lecture halls, and houses of worship find them indispensable.

Wireless microphones are key to the production of entertainment content, which is not only a major domestic industry, accounting for almost 5% of total U.S. employment, but also one of the nation’s consistently leading exports. Exports of entertainment content are three times the imports—the highest ratio by far of any U.S.-made product or service.

The demanding technical requirements for wireless microphones—highest audio fidelity, absolute reliability, effective propagation, and minimal delays in throughput—are best met through operation in locally vacant TV channels. Professional productions routinely employ 50-100 microphones, which need 6-10 TV channels. Some major events, like the Super Bowl and Grammy Awards, require more than twice that capacity.

When the 2009 digital TV transition reallocated the 700 MHz band—18 TV channels across 108 MHz—to commercial wireless and other services, wireless microphone users in these channels had to discard and replace their equipment at their own expense.

The upcoming 600 MHz auction, following the incentive auction, will displace still more wireless microphone users, including many who relocated to this band from 700 MHz.

Auction winners will use the cleared 600 MHz spectrum to provide services and generate revenues. To require major expenditures by wireless microphone users for the sole benefit of these providers is simply unfair.

In many past auctions, the FCC has required incoming auction winners to compensate spectrum incumbents for the cost of "relocating" to new frequencies. Congress should require the same here as to wireless microphone users.

Contact:

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[redacted]

January 31, 2014.

SBG
SINCLAIR BROADCAST GROUP

January 31, 2014

Honorable Fred Upton
Chairman
Committee on Energy & Commerce
U.S. House of Representatives
2123 Rayburn HOB
Washington, D.C. 20515

Honorable Greg Walden
Chairman
Subcommittee on Telecommunications
Committee on Energy & Commerce
2123 Rayburn HOB
Washington, D.C. 20515

Dear Chairmen Upton and Walden:

Sinclair Broadcast Group applauds the House Energy and Commerce Committee for launching the effort to review and revise the Communications Act. We look forward to working closely with the Committee on issues of primary interest to broadcasters and share with you here our preliminary responses to the Questions for Stakeholder Comment.

We agree that the current Communications Act's "siloed" approach to basing regulations on specific network technologies and services no longer serves an industry in the midst of convergence. We agree that, as a result of this convergence, many technologies and services are now functionally equivalent from a consumer perspective, and that continuing to regulate each such service differently based on its particular technology discriminates against some services, resulting in competitive imbalances that ultimately stifle innovation and lead to decreased consumer choice and increased consumer pricing. We therefore believe that the principles guiding a rewrite of the Communications Act should include the following:

<u>The new Communications Act should not discriminate against certain services based on the service's delivery technology</u>. The new Communications Act should not mandate, or allow the FCC to mandate, particular technologies for particular services. The FCC currently requires television broadcasters to use an outdated technology that is out of step with the global ecosystem. Wireless companies are praised for supporting development of the global LTE standard and being among the first to deploy LTE service. But television broadcasters do not have the freedom to deploy new technology based on new transmission and service standards. As a result, the consumers they serve with free over-the-air service are denied access to the advanced services that paying customers of cable and internet companies have. The new

Communications Act should not condemn those unable or unwilling to pay high monthly subscription fees to second-class information and entertainment services. Rather, the new Communications Act should allow television broadcasters to demonstrate the innovative services they can bring to this and other audiences and allow the free market to be the arbiter of what services and technologies consumers receive.

The new Communications Act should allow technology flexibility to spectrum licensees so that licensees can respond rapidly to new consumer opportunities. Every company using America's spectrum should have an equal right to innovate and respond to our rapidly evolving global technology environment. This flexibility is necessary for value creation in new products and services, but also to enable all spectrum companies to compete on the same footing with each other. Fair competition has long been a value for each "silo" in the "siloed" Communications Act. The new Communications Act should facilitate competition across those silos, or better yet eliminate those silos all together. Television broadcast should be on the same competitive footing as cable, satellite and internet delivery platforms.

The new Communications Act should limit the FCC's regulatory powers to instances where actual consumer harm is demonstrated and supported by data. The FCC's decision making should be fact-based and data-driven rather than ideologically-based. For example, limitations on television station ownership implemented decades ago no longer achieve their originally intended purposes of protecting diversity, localism, and competition – and today actually harm consumers. These policy goals can be achieved in ways other than by keeping the broadcast industry from innovating, achieving efficiencies, and effectively competing. Evidence has long demonstrated that consumers are not harmed when multiple television stations are owned by one broadcaster in a market – indeed that arcane regulations stifle competition among technologies/service providers.

The new Communications Act should substantially relax or eliminate the local and national ownership rules. Why should a service that is made available for free be subject by the government to vastly more restrictive ownership limits than subscription services? Broadcasters are limited to owning two television stations (12 MHz) in any one market and can serve only 39% of the country's population, while wireless companies can (and do) routinely hold 100 MHz or more per market and dozens of MHz nationwide. And broadcasters face far more direct competition than do wireless carriers. In a converged world, tipping the regulatory scale among content providers decreases competition, diversity and consumer choice, and increases consumer pricing. Congress did not intend this result. In 1996 it ordered the FCC to re-evaluate its broadcast ownership rules every two (now four) years and to "repeal or modify" any rule no longer necessary because of competition. But Congress' intent has never been realized: the ownership rules today are as onerous as they were in 1996. And the FCC is now considering rules that would further limit broadcast ownership (ironically, as part of the quadrennial review, in which the FCC is supposed to be considering which rules can be eliminated).

The new Communications Act should not distinguish between information services and communication services. The new Communications Act should acknowledge that the internet (an "information" service) has become a major delivery vehicle for news and entertainment created by the "communication services", making this distinction no longer meaningful. In collapsing the distinction between these services, the new Communications Act should also seek to treat all such services similarly.

We appreciate the opportunity to provide our views as this long-awaiting revision process gets underway and look forward to working with you and all Members of the Committee and their staffs on this critical initiative.

Sincerely,

Rebecca Hanson

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cc: Hon. Henry A. Waxman, Ranking Member
Hon. Anna Eshoo, Ranking Member

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January 31, 2014

To: The House Energy and Commerce Committee
Re: Modernizing the Communications Act

We are pleased to submit our ebook *The Need for Speed,* published by Brookings Institution Press, which details a new framework for U.S. telecommunications policy in the digital age. We believe the Committee staff will find our review of the issues and suggested framework quite useful as they begin to prepare for a Communications Act rewrite. We agree with the Committee that our national communications law, including the landmark update of 1996, has been overtaken by breathtaking innovation that has restructured the market in ways that few anticipated 18 years ago. As the Committee's White Paper notes, the 1996 law assumes silos that no longer exist and "did not envision the intermodal competition that exists today."

The Need for Speed offers policy adjustments designed to encourage additional investment to support the continued expansion of high-speed broadband networks and to encourage the innovation necessary to maximize the benefits of Internet-based communications. The book also sets forth ideas on how to ensure consumers are protected in this dynamic market. For example, we propose adjustments in FCC responsibilities by encouraging a new focus on consumer protection, removing the Commission from the merger review process, and eliminating its ability to condition spectrum purchases on the identity, business plans, or existing spectrum holdings of an auction bidder. We also suggest greater leeway for broadband providers to experiment with new business models and service arrangements – subject to case-by-case review of discrimination claims and other allegations of abusive conduct.

We would be happy to discuss *The Need for Speed* or respond to any questions you may have about the book or other telecom issues.

Respectfully submitted,

Robert Litan and Hal Singer

ppi

CELLULARONE

Pioneer Cellular

Appalachian WIRELESS

January 31, 2014

The Honorable Fred Upton
Chairman
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20510

The Honorable Henry Waxman
Ranking Member
Committee on Energy and Commerce
U.S. House of Representatives
Washington, D.C. 20510

The Honorable Greg Walden
Chairman, Subcommittee on
Communications and Technology
U.S. House of Representatives
Washington, D.C. 20510

The Honorable Anna G. Eshoo
Ranking Member, Subcommittee on
Communications and Technology
U.S. House of Representatives
Washington, D.C. 20510

Re: Comments in Response to White Paper
Released By the Committee on January 8, 2014

Chairman Upton, Ranking Member Waxman, Chairman Walden and Ranking Member Eshoo:

On behalf of Smith Bagley, Inc. d/b/a Cellular One ("Cellular One"), Cellular Network Partnership d/b/a Pioneer Cellular ("Pioneer Cellular") and East Kentucky Network, LLC d/b/a Appalachian Wireless ("Appalachian Wireless") (collectively, the "Rural Wireless Carriers"), we write in response to the Committee's White Paper, released January 8, 2014, seeking comment on an update to The Communications Act of 1934, as amended (the "Telecom Act").

Cellular One, Pioneer Cellular and Appalachian Wireless support the idea of updating the Telecom Act. As carriers collectively serving hundreds of thousands of citizens, we share common interests with many other regional and rural carriers across the country. We are willing to assist the Committee during this process, by providing information for the record, sharing comments on proposed legislation, and participating in hearings.

These comments are broken into three sections, a background on our companies, an overview commentary on some aspects of a Telecom Act rewrite that the Committee will hopefully find useful, and direct answers to the questions posed.

Background

Throughout the Four Corners region of the Southwest (Arizona, New Mexico, Colorado and Utah), Cellular One serves over 100,000 customers in a rural region where most of its service area has less than ten households per square mile. The company operates a 3G network and intends to deploy 4G at the earliest possible date.

Cellular One operates the most extensive commercial mobile wireless network serving the Navajo, Zuni, Hopi, White Mountain Apache, and Ramah Navajo in the Southwest United States, and area roughly the size of West Virginia. Much of the Cellular One network has been constructed and maintained with support from the federal universal service fund. The high-cost and low-income programs are largely responsible for the dramatic increase in telephone penetration in these areas between 2000 and the present.

Pioneer Cellular is a Partnership Group comprised of Pioneer Telephone Cooperative, Inc., KanOkla Telephone Association, South Central Communications of Kansas, and Hinton Cellular Company in Hinton, Oklahoma. Established in 1988, the group serves customers in 47 counties in western and southwestern Oklahoma and 14 counties in southern Kansas by using over 300 cell sites. Pioneer Cellular provides services to over 60,000 subscribers.

Appalachian Wireless is a provider of wireless service in the Appalachian Mountains of eastern Kentucky and southwestern Virginia, where it has been licensed for many years and has a longstanding record of serving small and rural communities. It serves over 120,000 customers in its service area. Larger national wireless carriers have largely ignored or offered minimal service in the small towns and rural areas that Appalachian Wireless serves. Without Appalachian Wireless' expenditure of resources to build out its wireless network, many of the areas it currently serves would most likely lack any reliable access to wireless voice and high-speed broadband services.

To put Cellular One, Pioneer Cellular and Appalachian Wireless in perspective, the three companies combined serve less than 300,000 subscribers. The nation’s two largest facilities-based mobile wireless carriers each serve over 100 million subscribers. The next two each serve over 30 million subscribers, and the fifth largest carrier serves roughly five million customers.

General Comments on Telecom Act Reform

Most regional carriers, including the Rural Wireless Carriers, focus primarily in rural areas, while the big four carriers focus on areas best described as urban, suburban and major highways. In the Rural Wireless Carriers' experience, large carrier business plans focus on serving areas that preserve high margins and meeting shareholder expectations for earnings per share, share buybacks, and dividends. The high capital expenditures required in high-cost rural areas is inconsistent with these objectives.

In contrast, smaller and more rural focused carriers provide higher quality service in areas that would otherwise have been ignored or underserved. In the case of the Rural Wireless Carriers, this has translated into a successful business model that delivers superior coverage, excellent customer service, job creation, and a boost to the economy in rural areas. A Telecommunications Act update must ensure that rural citizens receive high-quality service that is reasonably comparable to those in urban areas.

Representatives Upton and Walden recently observed that, "[f]rom the earliest days of the telephone to today's wireless broadband Internet, the communications sector has been a driver of technological change and economic activity for more than a century." (Multichannel News Guest Blog, Jan. 9, 2014). However, by any measure, the market for wireless services is highly concentrated, and this concentration has increased significantly over the last decade as a result of merger and acquisition activity.

Today, four carriers—Verizon Wireless, AT&T, T-Mobile, and Sprint—hold the lion's share of all spectrum, measured on a MHz/POP basis, that is potentially usable for providing mobile wireless services, especially the most valuable spectrum below 1 GHz. The big four now divide up over 95% of the marketplace, with AT&T and Verizon Wireless accounting for nearly 70% of wireless industry revenue.[1] In contrast, the top two firms in the auto industry collectively hold less that 35 percent market share.[2]

The Department of Justice has similarly concluded that the wireless marketplace is highly concentrated. In 2011, the Department of Justice (DOJ) alleged that the proposed merger between AT&T and T-Mobile would result in a Herfindahl-Hirschman Index ("HHI"), of more than 3,100 for mobile wireless telecommunications services nationwide, an increase of nearly 700 points. DOJ stated, "These numbers substantially exceed the thresholds at which mergers are presumed to be likely to enhance market power."[3]

Excessive market concentration is harmful to rural consumers because it enables the largest carriers to exert tremendous leverage over small carriers on a host of competitive

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[1] See http://venturebeat.com/2013/07/08/iphone-carrier-consolidation/

[2] See http://www.edmunds.com/industry-center/data/market-share-by-manufacturer.html

[3] *See USA v. AT&T, Inc., T-Mobile USA, Inc. and Deutsche Telekom, AG, Complaint, Case No. 1:11-cv-01560*, available at, http://www.justice.gov/atr/cases/f274600/274613.htm .

issues. This is especially true because our nation's mobile wireless technologies continue to be divided into two camps: Verizon/Sprint (CDMA) and AT&T/T-Mobile (GSM).[4] Among the competitive issues faced by smaller carriers are:

Interconnection. Small carriers must interconnect with one of these two camps (CDMA and GSM), so that customers' calls can be completed. The lack of choices confers enormous market power on large carriers, who are empowered to dictate the price of roaming and have the capability to deploy tools to prevent their customers from using a small carrier network in a rural area, even when it offers a strong signal.

Interoperability. The largest carriers have a lock on the handset marketplace, with power to dictate how handsets are designed, sometimes to the detriment of consumers and smaller regional/rural carriers. In the case of the 700 MHz band, the largest carriers used their leverage over handset design to jeopardize the significant spectrum investments of smaller carriers. Ultimately, the FCC had to step in to force 700 MHz interoperability, to ensure that when consumers buy popular handsets they will work throughout the country on all compatible bands. Congress should ensure that any future spectrum allocations include an interoperability mandate to protect consumers and to preserve competition in the wireless marketplace.

Size of Geographic Licenses. When the FCC allocates new spectrum for auction, the largest carriers favor large geographic license areas, despite specific language in Section 309(j) of the Act requiring the FCC to allocate spectrum so as to *increase* opportunities for small business, women, minority groups and rural telephone companies. In the upcoming incentive auction, the largest carriers seek license areas defined along 176 Basic Economic Areas, rather than 734 Cellular Market Areas.

Auctioning spectrum using smaller blocks increases opportunities for small business and raises more money for the U.S. Treasury, due to increased competition throughout the country. Specifying smaller blocks also increases the quantity of service in rural areas. A buyer of a large block can meet its build-out obligations by constructing network facilities in the urban/suburban parts of its licensed area, without ever having to build in the rural parts. By contrast, when a rural carrier purchases a rural block, it must meet its build requirement by constructing network in the rural areas. All of these factors should lead Congress to improve Section 309(j) of the Act to ensure that small geographic spectrum blocks are used at auction.

[4] As of this date, these two camps will continue for the foreseeable future, even in a 4G LTE world.

Specific Responses to Subcommittee Questions

1. The current Communications Act is structured around particular services. Does this structure work for the modern communications sector? If not, around what structures or principles should the titles of the Communications Act revolve?

The 1996 Telecom Act was bipartisan legislation, enacted to promote competition and reduce regulation. That should be the central organizing theme for an update. Congress should systematically identify all areas where the 1996 Telecom Act failed to increase competition, reduce regulation, and seek to draft corrective language. Yet, it is important to understand that simply referring injured parties to our nation's anti-trust laws is a recipe for a duopoly. Regulation that protects competition is critical, especially at a time when the market is so concentrated and the largest carriers wield tremendous power. We suggest the following general principles:

- The FCC's mandate to promote competitive communications markets must ensure that small business and rural consumers are not disadvantaged.

- Legislation should ensure that all service providers are subject to regulatory structures that are competitively neutral and designed to permit competition on a level playing field.

2. What should a modern Communications Act look like? Which provisions should be retained from the existing Act, which provisions need to be adapted for today's communications environment, and which should be eliminated?

Congress should adopt the following core principles, for all service providers using any technology:

Public Safety: The FCC must ensure that 911, E-911, and next generation 911 services are rapidly deployed throughout the nation and that consumers have access to easily understood information that explains how modern emergency services can be accessed on any device that is capable of connecting to public communication networks. All providers must provide access to modern emergency services, when corresponding technology at our nation's PSAPs is updated.

Congress cannot place upon carriers the burden of developing modern and robust emergency services if PSAPs are not prepared to take advantage of them. Long after the FCC required wireless carriers to deliver Phase II E-911 capabilities, many PSAPs had not upgraded their facilities to make use of the new technology. At this week's FCC open meeting, Chairman Wheeler urged PSAPs to accelerate deployment of next generation capabilities so that our citizens can take advantage of them at the earliest possible date. Congress can appropriate funding for both carrier and PSAP upgrades, and require the FCC to coordinate such upgrades so that carriers are not forced to invest in technology that is not useful. The quality of emergency services in rural areas would benefit greatly from funding mechanisms that assist both carriers and PSAPs in purchasing and installing necessary equipment. In short, the process for next generation 911 services must improve upon the former E-911 upgrade process.

Universal Access: A universal service fund must ensure that consumers living in rural high-cost areas have access to services and service quality that are reasonably comparable to those living in urban areas, including access to wireline and wireless networks. A competitively neutral system that promotes deployment of broadband networks in areas that would not otherwise have service is essential to our nation's economic future and is critically linked to public safety in rural areas.

Competition: Section 309(j) already requires the Commission to promote the dissemination of licenses.[5] This principle must be maintained and perhaps expanded to ensure that, to the greatest extent possible, consumers have choices in services and service providers. Legislation that requires the FCC to auction smaller blocks of spectrum will increase opportunities for small business, many of which are owned by women and members of minority groups.

Interconnection of Networks: One of the most powerful enablers of competition is a requirement that all consumers must be able to connect to all other consumers. When a carrier refuses to connect its network, either directly or indirectly, it reduces the utility of consumer devices. In the wireless industry, roaming is a form of interconnection, even in an all-IP world. Any action that prevents a carrier from efficiently interconnecting its network into the Internet, or roaming on another network, should be disfavored.

Competitive neutrality: Following the 1996 Act, the FCC adopted the core principle of competitive neutrality – that all universal service rules must not favor any particular class of carrier or technology.[6] That same principle should apply wherever possible throughout a revised statute, so that consumers, to the greatest extent possible, are able to choose the services that best suit their needs.

Consumer Access: The FCC should be empowered to adopt regulations to ensure that consumers are not denied access to any lawful content, or subject to unreasonable discrimination in service quality or pricing when accessing such content.

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[5] Under the Communications Act, in specifying eligibility for spectrum auctions, the Commission is directed to achieve the objective of "promoting economic opportunity and competition and ensuring that new and innovative technologies are readily accessible to the American people by avoiding excessive concentration of licenses and by disseminating licenses *among a wide variety of applicants,* including small businesses, rural telephone companies, and businesses owned by members of minority groups and women." *See* 47 U.S.C. § 309(j) (emphasis added).

[6] *See In the Matter of Federal-State Joint Board on Universal Service,* 12 FCC Rcd 8776 (1997).

Tribal Lands: Most tribal lands present a special case for the FCC, because they are remote, high-cost to serve, sparsely populated, have poor infrastructure, have poor economic demographics, or sometimes all of the above. In recent years, the FCC has worked very hard to improve inter-governmental relations and to ensure that low-income tribal members have access to basic telephone service through the federal Lifeline program.

That said, the FCC has not done enough to recognize many tribal areas as having special needs when it comes to infrastructure. For example, the FCC allowed the legacy universal service support mechanism to lapse on tribal lands, replacing it with an amount of support that, at present, appears to be insufficient. Infrastructure investment on remote tribal lands in Cellular One's service area is significantly behind where it would have been, but for the reduction in high-cost support.

Cellular One in particular asks Congress to look carefully at steps which can be taken to identify tribal lands with extraordinary needs, and direct universal service and other grant funds to such areas, so that all carriers can compete for such funds and ultimately deliver advanced telecommunications services to tribal lands that have for decades trailed the rest of the country.

3. Are the structure and jurisdiction of the FCC in need of change? How should they be tailored to address systemic change in communications?

The FCC's jurisdiction over our nation's telecommunications networks is currently imperiled. The current statute creates a common carrier regime under Title II, providing the agency with plenary authority to impose traditional common carrier regulations on telecommunications carriers, including for example, prohibitions against unreasonable discrimination, unreasonable business practices, and the entire universal service regime. When the FCC decided that information services should be free from Title II regulation, it freed Internet access providers from common carrier regulations.

This decision has created tremendous problems with the coming transition to all-IP networks. Once a carrier discontinues traditional circuit switched telephony, and is operating an all-IP system, it may properly claim to be free of the current Title II regime because it is no longer providing telecommunications services. So, for example, a carrier may decide that it is not going to interconnect its network with one or more carriers. It may decide that it no longer required to contribute to universal service mechanisms. It may engage in unreasonable business practices, free from FCC oversight.

To regulate such carriers, the FCC would probably have to resort to Section 706, a provision that Congress did not even put inside the Telecom Act, and which is intended to promote broadband investment. These are not good options for the agency, nor are they good options for consumers.

The better course would be for Congress to clarify the agency's jurisdiction. Congress must allow the FCC to require all carriers to act in ways that protect public safety, competition and consumers.

4. As noted, the rapidly evolving nature of technology can make it difficult to legislate and regulate communications services. How do we create a set of laws flexible enough to have staying power? How can the laws be more technology-neutral?

The Rural Wireless Carriers favor codifying a principle of competitive and technological neutrality. All FCC rules should be drawn so as to not favor any class of carrier or particular technology. Giving any carrier a right of first refusal over shared benefits is not competitively neutral.

5. Does the distinction between information and telecommunications services continue to serve a purpose? If not, how should the two be rationalized?

The distinction between information and telecommunications services no longer serves a regulatory or practical purpose, and should be replaced with a single definition, broad enough to encompass all communications by wire (including fiber) or radio.

In 1996, the vast broadband capability of the current Internet was not fully envisioned. For example, IP telephony standards were not in place. Fixed and mobile video over the Internet did not exist. The "Internet of Things" was not yet conceived. As stated above, when traditional telephone carriers, both wireline and wireless, move to all-IP networks, it will be argued that neither the FCC nor state public utility commissions possess authority to regulate their businesses. At the state level, the argument will be that Internet service is interstate and therefore free from state jurisdiction. At the federal level, the argument will be that since the carrier is providing broadband service, it is free from Title II regulation. These fights will consume years in litigation.

Congress is confronted with the question of how best to ensure that modern broadband networks, and communication technologies of the future, will continue to be constructed, maintained and operated in a manner that fosters public safety and economic development, and that ensures universal access by all of our citizens.

We suggest that Congress review the Act to ensure the FCC has clear grants of regulatory authority over all communications technologies in the six subject areas listed in the response to question 2 above. Once general jurisdictional boundaries are clarified, work can begin on crafting legislation and corresponding FCC Rules that accomplish the Act's core mission of promoting public safety, competition, universal service, and consumer protection.

Cellular One, Pioneer Cellular and Appalachian Wireless stand ready to the assist the House Energy & Commerce Committee as it begins the process of updating the nation's telecommunications laws. A critical element of any rewrite must be that the nation's citizens living in rural and more remote areas of the country are not ignored or underserved, but are provided access to the same competitive telecommunications and broadband services that are being deployed throughout the country at a rapid pace. To do otherwise would create areas of the country that lack any reliable access to wireless voice and high-speed broadband services thereby impacting economic growth and community development.

We thank you for this opportunity.

Respectfully submitted,

/s/ Louise Finnegan
Louise Finnegan
Chief Executive Officer

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